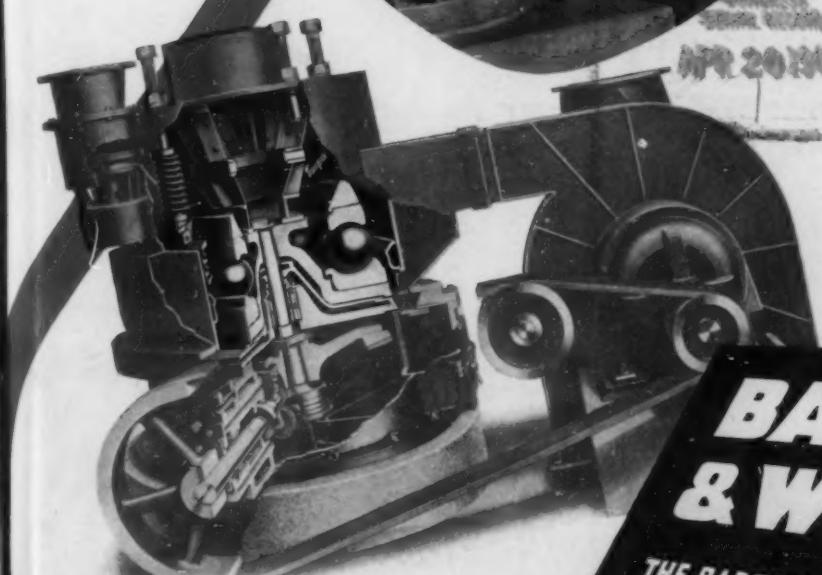
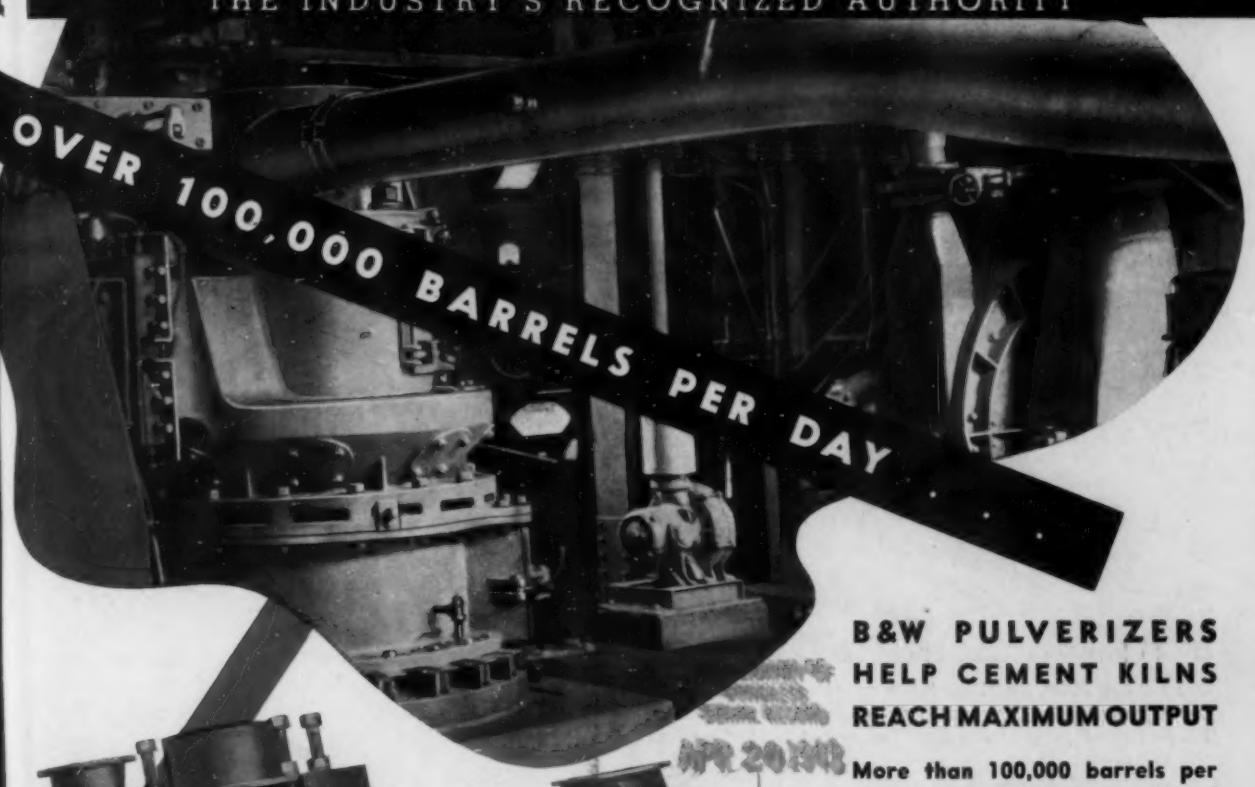


Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY



B&W PULVERIZERS HELP CEMENT KILNS REACH MAXIMUM OUTPUT

More than 100,000 barrels per day is the combined capacity of cement kilns using this Type E Babcock & Wilcox Pulverizer for direct-fired rotary kilns.

B&W Pulverizers, with a high availability record, are aiding cement men in meeting production goals.

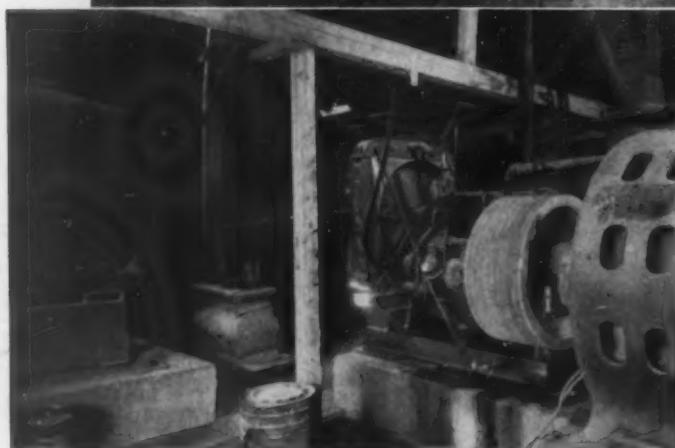
BABCOCK & WILCOX

THE BABCOCK & WILCOX COMPANY
85 LIBERTY STREET, NEW YORK, N.Y.

APR 19 1943

THIS 700 TON-PER-DAY PLANT IS

POWERED by
BUDA
Throughout



One 150 h.p. BUDA Diesel drives the crushers, a second operates a 100 KW generator, and a 90 h.p. BUDA Diesel drives the log washer at this completely BUDA-powered plant at Dry Run, Pa., owned by Binkley Bros. and Ober.

ALERT plant operators, faced with the problem of delivering huge wartime tonnage promptly yet foreseeing the days of keen peacetime competition ahead, are turning to BUDA Diesel power because it offers complete reliability to meet today's overtime demands without a let-down, plus exceptionally long life that keeps efficiency high even after thousands of hours of tough service. The BUDA Diesel you install for today's big job will deliver the same low-cost power with minimum repair and maintenance in the years to come—when lower power costs may spell the difference between profit or loss!

BUDA Engines Will Cut Your Power Costs On:

Crushers

Trucks

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Washers

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Generators

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Draglines

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Pumps

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Write or wire for full information on BUDA'S complete line of Diesel, gasoline, natural gas and butane engines—from 20 to 340 h.p.

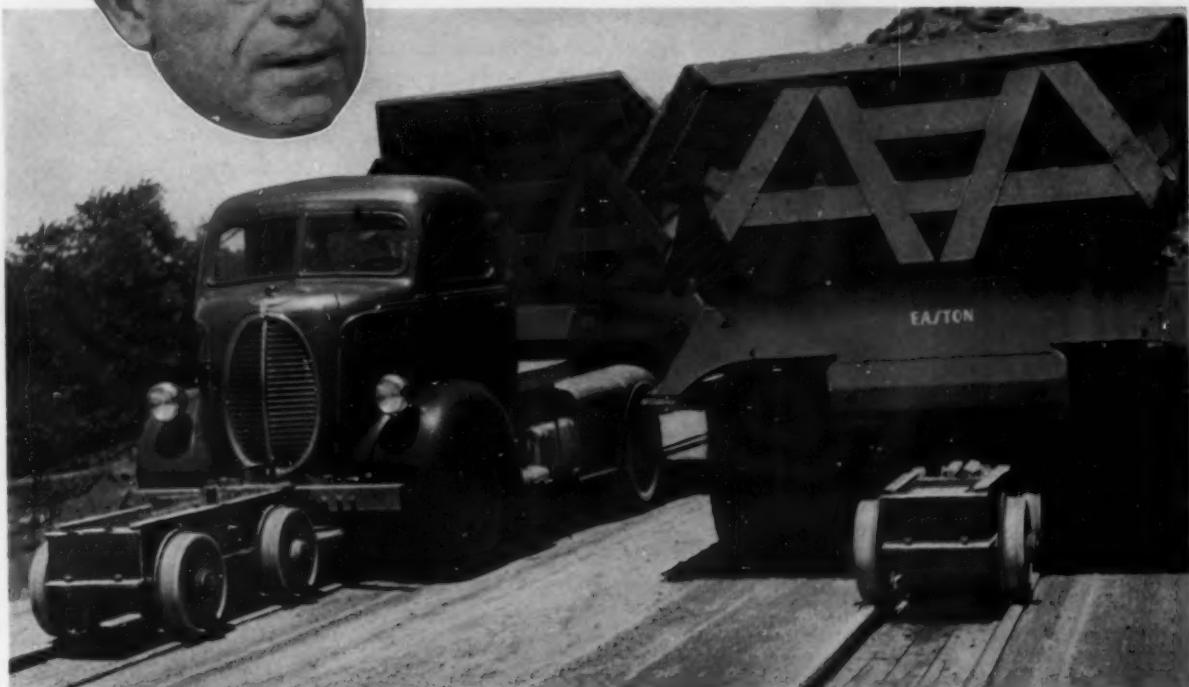
THE BUDA COMPANY

HARVEY (Chicago Suburb) ILLINOIS

GASOLINE and DIESEL ENGINES—20 to 340 H. P.



WINNER ... JOE Q. TAYLOR, general superintendent of a well-known quarry corporation. Mr. Taylor's new Two-Way Barney Car System, used at one of his company's quarries, was selected for first prize in the "Hints and Helps" Contest sponsored by Rock Products. The award, a \$100 War Bond, was announced in the January 1943 issue of Rock Products.



LICKS 11% GRADE

adds tons to each payload, saves gas and tires!

The Two-Way Barney Car System moves 15-ton payloads up an 11% incline 747 feet long in 48 seconds. Here, briefly, is how it works (see photo above). The empty tractor-trailer, coming down the dual-road incline under some of its power, pushes a barney car before it. The barney car is attached to a cable which extends to the top of the incline, runs free around bull wheels, and carries down the opposite side of the dual-road to a second barney car. The push of the empty unit on the downgrade is carried through the cable to the second barney car which pulls uphill against the rear axle of the loaded trailer.

Thus, one tractor-trailer unit serves to balance the other's weight on the incline, and the only power required

of the two units is that which is used to raise the actual payload. The upgrade run, formerly hard on the transmissions of the tractors, and costly in gasoline and tires, is now easy and economical.

Toy trucks, toy cannon and fishing line were some of the materials used on Joe Taylor's first small-scale model of the system. But the main ingredients were 'know-how', and an expert knowledge of semi-trailer haulage. Joe Q. Taylor was one of the first quarrymen to recognize the advantages of EASTON Semi-Trailers. Today he commands a fleet of 32 EASTON TR-10's serving all four of his company's quarries.

The complete story of the Two-Way Barney Car System is told in EAS-

TON Bulletin 183. Natural color movies of the installation are available to be shown on request. EASTON can furnish complete equipment and engineering for similar installations, and can also provide useful information on many other short-cuts to conservation and bigger payloads. For a copy of Bulletin 183, or for helpful advice on your own haulage problem, write to: Engineering Counsel, Easton Car & Construction Company, Easton, Pa.

B-1005



AGITAIR



Looking down into the Agitair Cell.
Aeration is complete.

Flotation Equipment for Non-Metallic Processes

Cement
Phosphate
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Fluorspar
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Mica
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The flotation process is being utilized in the treatment of all of the above indicated products and the Agitair Flotation Machine is ideal for utilization in flotation treatment schemes applicable to non-metallic materials.

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Bulletin 421
is yours on
request

THE GALIGHER COMPANY

48 South 2nd East
SALT LAKE CITY, UTAH

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APRIL, 1943
VOL. 46 • NO. 4

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ROCK PRODUCTS

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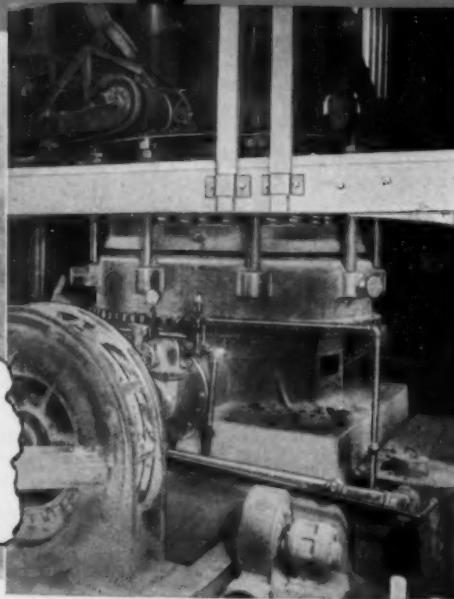
THESE THREE SABOTEURS failed!

"We are sending you under separate cover, one eight pound hammer head and two picks which passed through our Secondary Crusher on Sept. 18, 1942, without apparently doing any damage.

This is such a remarkable demonstration of the power and efficiency of your 48" TELSMITH Gyrasphere Secondary Crusher, that we feel you should have these specimens as proof of the statement. This machine at the time was set for one-half inch discharge, which makes the demonstration more remarkable.

We get a large percentage of tramp iron
* * * In the past this was a source of grave trouble but since installing your machine tramp iron doesn't bother us."

NAME ON REQUEST



they didn't even stop this **TELSMITH** **Gyrasphere SECONDARY CRUSHER**

A silent, skulking saboteur—Tramp Iron constantly menaces your production. Get the insurance against shut-downs of Telsmith's *spring relief*. The crusher's concave bowl is backed by heavy springs, adjustable as to compression. When tramp iron gets in, it causes undue pressure in the crushing bowl. The springs let the concave

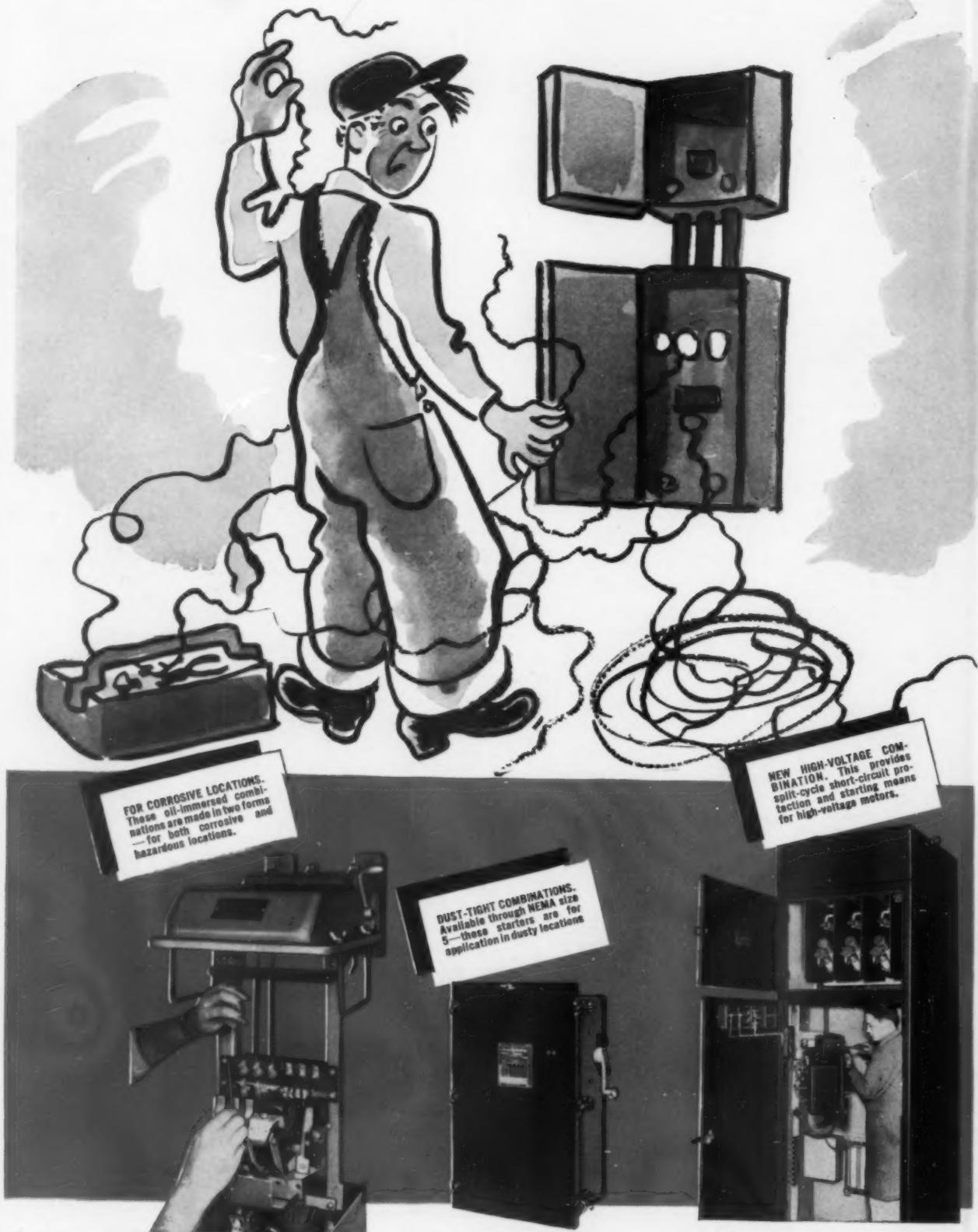
bowl tilt at the point of stress. The pressure is relieved. The concave resumes its normal position. Crushing goes on as usual. The same relief is afforded when crusher bowl is packed by fines. This means a greatly increased capacity in fine crushing, continuous operation and minimum upkeep. *For the whole story, get Bulletin Y-11.*

Y-3

SMITH ENGINEERING WORKS, 508 E. CAPITOL DRIVE, MILWAUKEE, WISCONSIN

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CONTROL THAT WAY!
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MOTOR STARTERS?

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But that isn't all—combination starters save critical material by eliminating unnecessary conduit; and they offer your operators better protection because the case door is interlocked with the safety switch.

Save man-hours and critical material by specifying General Electric combination starters. General Electric Company, Schenectady, N. Y.

FOR HAZARDOUS LOCATIONS
Enclosed in a high-strength, alloy case, these starters are ideal for Class 1, Group B, locations.

WATERTIGHT COMBINATIONS
For outdoor application and locations.

FOR GENERAL-PURPOSE USE
These combinations are for indoor applications where atmospheric conditions are normal.

COMBINATION STARTERS FOR MOTORS FROM 1 TO 1000 HP

APRIL, 1943



to users of Timken Bits the nation over . . .

Beyond the merits of the Timken Bit, the service Timken Rock Bit users enjoy is fully comparable to the excellence of the product itself. Fifteen factory branches are strategically located throughout the United States. In each area serviced by these branches are a number of leading Authorized Distributors for Timken Bits. Thus, no matter where you are located you have local availability. Moreover, there are conversion and reconditioning shops nearby if you desire to avail yourself of their facilities.

A large number of rock bit specialists are employed to help on bit drilling problems. These men and the users they serve can command the services of Timken Service Engineers, thoroughly trained not only on the subject of rock bits but in all phases of mining, quarrying and construction work that influence drilling operations.

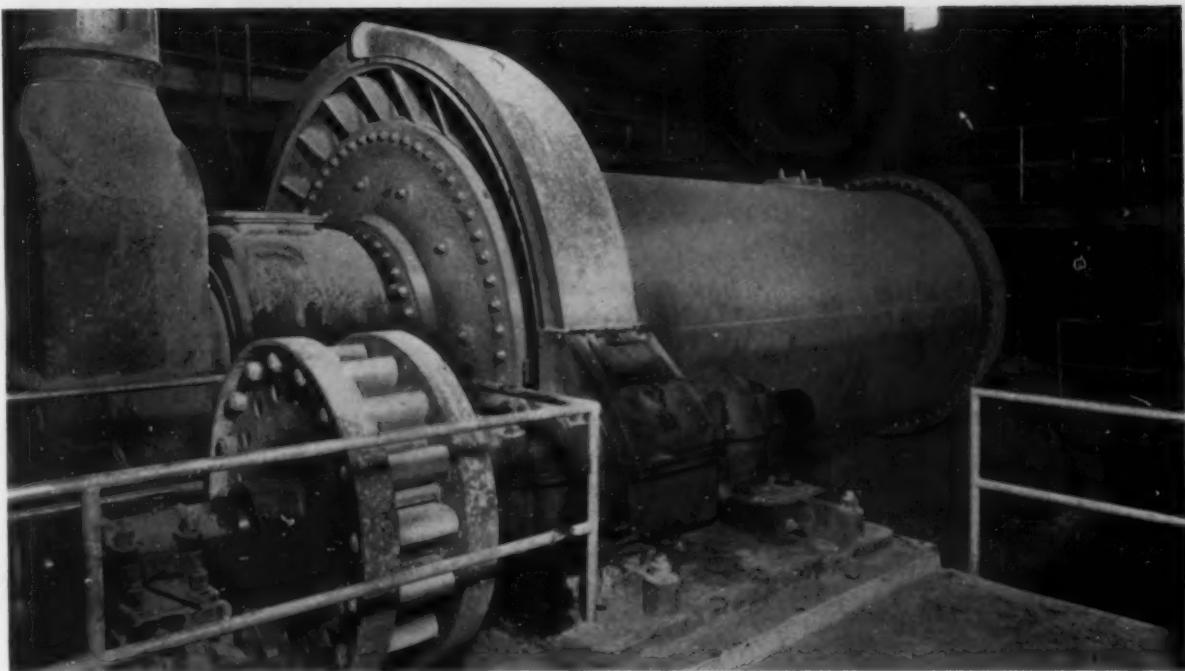
Two essentials to the outstanding popularity of the Timken Bit have been and will continue to be (1) high quality of the product itself and (2) good service.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
ROCK BITS

TRA YLOR

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Rotary Coolers
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Jaw Crushers
Gyratory Crushers
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Crushing Rolls
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Feeders
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Elevators

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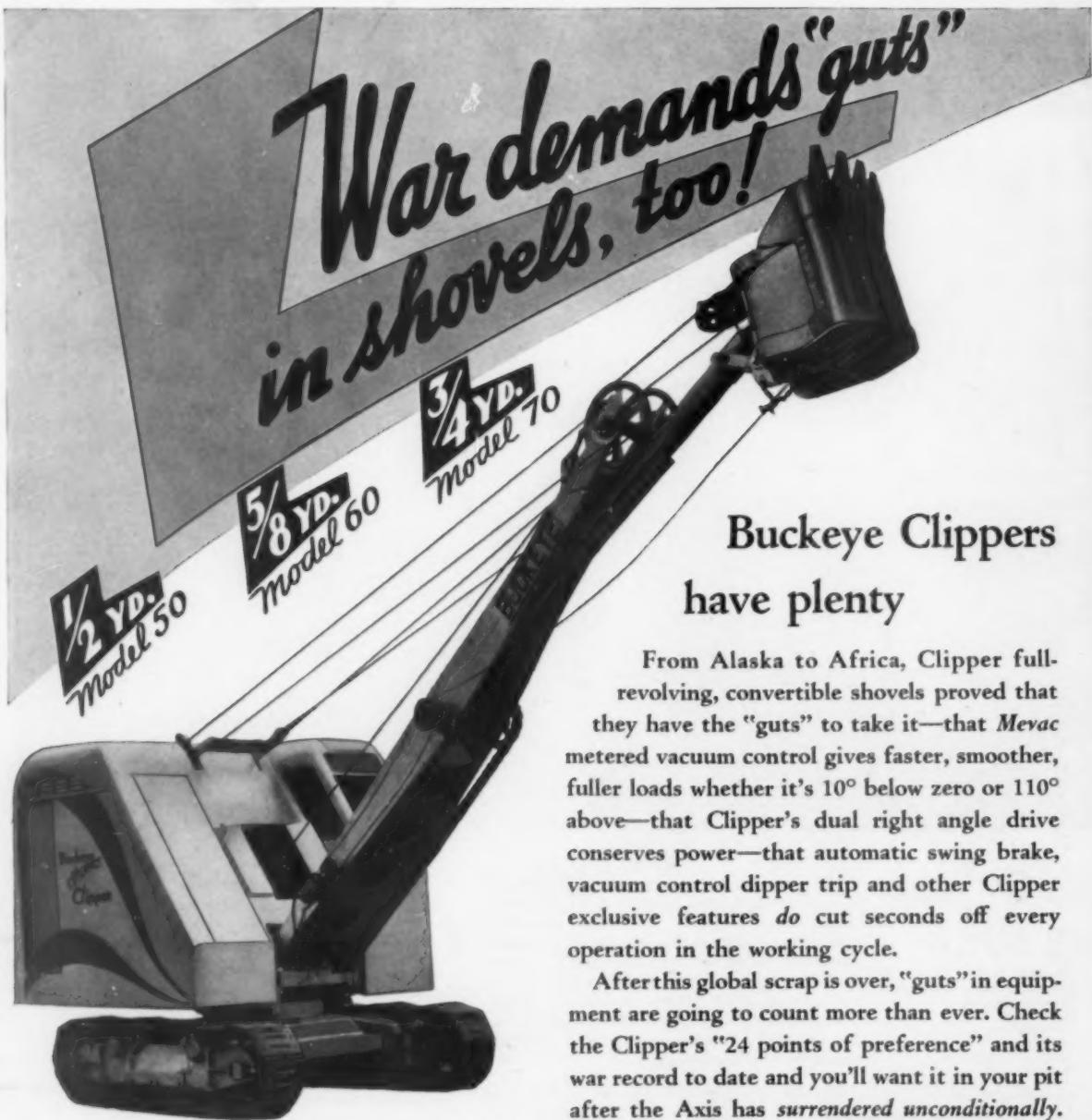
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After this global scrap is over, "guts" in equipment are going to count more than ever. Check the Clipper's "24 points of preference" and its war record to date and you'll want it in your pit after the Axis has surrendered unconditionally.

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Findlay, Ohio



CONVERTIBLE SHOVELS, TRENCHERS AND BACKFILLERS, TRACTOR EQUIPMENT, R-B FINEGRADERS, ROAD WIDENERS AND SPREADERS



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Wars demand scrap.
Invest in War Bonds.
No laying down on jobs.

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655,000 TONS

roll out of this
ONE IOWA MOROK PLANT

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WAR begins with aggregate. It is the basis of every foundation — for plant expansion, for flying field, for cantonment, for arsenal and hospital.

M. O. Weaver's Morok plant is one of the many Iowa Cedarapids portable crushing plants that is producing for Victory. 655,300 tons of material rolled out of this plant in 1942 in spite of the fact that it was moved four times from widely divergent points. The monthly average output for the periods when the plant was actually on the job location, was 73,000 tons. That is enough material to provide 25 runways 200 ft. wide, a mile long and 6 inches thick.

Output like this gives you some idea what it means to have an Iowa Cedarapids plant — it means a smooth running job, free from hitches and giving easy portability when you are faced with a move — Iowa Cedarapids plants keep-a-runnin'. These are things that are going to be mighty important after the "Duration". They are going to play a real part in the success of post war contracts. The Iowa line is complete and can be engineered to meet any aggregate production problem either from the standpoint of output or character of materials for either an entire plant or any part of a plant.

Come to Headquarters for Aggregate producing equipment.



IOWA MANUFACTURING CO.

Cedarapids

Built by
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and prove to yourself that
**BEMIS MULTIWALL PAPER
BAGS** are showerproof

TAKE a Bemis Multiwall Paper Bag, filled with your cement, and set it out in the weather. Let it rain...let it pour! (If the air is filled with sunshine around your plant, use a hose to simulate rain.)

After you're convinced that the bag has been in more weather than it ever will have to stand in ordinary use, let it set 'til it's dry. Then open it, and see how freely the cement pours out!

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We'd like to have you know about the qualities of Bemis Multiwall Paper Bags before you place another bag order. So, we suggest you try this experiment soon. We'll send sample bags for the trial, if you'll ask for them. No charge and no obligation, of course.

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*From the
ALCAN to the*

**PAN AMERICAN
Highway -**



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Pioneer

PIONEER ENGINEERING WORKS, Inc.
MINNEAPOLIS, MINNESOTA, U. S. A.

4 WAYS to get more service from WIRE ROPE

Yes, wire rope is tough. It can stand up to the most rigorous service—and ask for more.

But that's no reason to abuse it. With a little care, by applying a few simple rules, you can get a tremendous amount of extra service from your rope.

1 Break it in with light loads

For example, when breaking in a new rope, don't slam on full power and speed right off the bat. Begin with fairly light loads. Operate at moderate speed. Give the strands of the rope a chance to seat down snugly and uniformly upon the core, so that each strand is carrying its fair share of the load. This way, the rope will assume its proper "constructional stretch" without damage, and you'll be assured of better spooling and easier handling throughout the entire life of the rope.

2 Treat it with consideration

After the rope is broken in, you can safely use whatever speeds and loads it was designed for. But don't be unnecessarily rough, even then. A smooth, gradual application of power is just as efficient as slamming into the load

with a jerk. The same is true of braking. It's the heavy jerks and surge loads that beat the guts out of a piece of rope. Nine times out of ten these can be avoided without losing time.

3 Know your rope

For example, if you're using a flexible 8-strand rope for high-speed work, don't overload it. This rope is built to withstand bending fatigue and fast operation—not for heavy hogging lifts. The opposite is true of heavy-duty 6-strand rope. Lift with it—but don't try to break speed records.

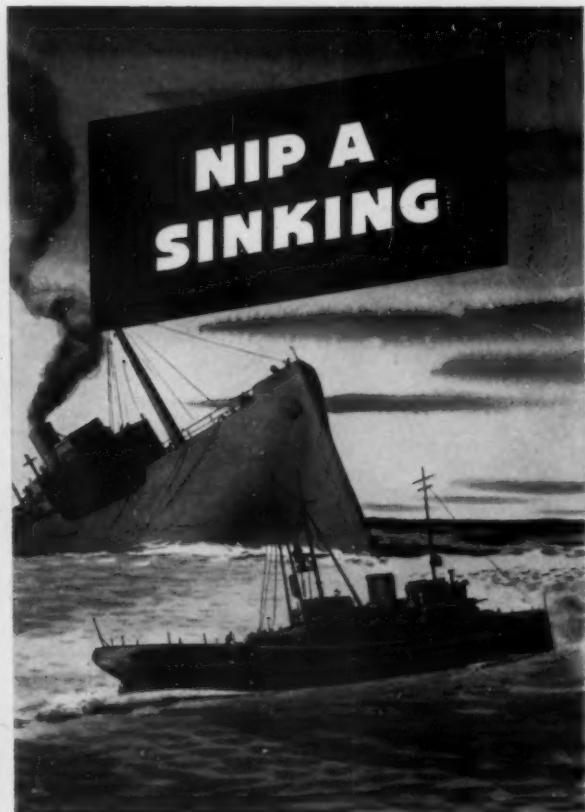
4 Right maintenance means plus service

Don't neglect the few simple maintenance precautions which require so little time yet return so much in extra service. Keep your rope properly lubricated. Don't operate it over sheaves that are abraded, damaged, or out of line. Fasten clips in the approved manner. Cut off a short length from the drum end of your rope from time to time so that "grief spots" are relocated over sheaves and drums.



Wire rope is now a war weapon. Its proper use is a service to your country and to yourself. If you want good, dependable rope, and friendly service, get in touch with the Bethlehem Wire Rope distributor in your territory. He's always ready and willing to serve you.

Bethlehem Manufactures Wire Rope for all Purposes



...the Navy uses RPM DELO!

The men who fight in U. S. Navy submarines believe that Japan is entitled to half the Pacific—the bottom half! That's where they're sending thousands of tons of enemy shipping.

But this isn't a one-way war. Many of our ships have been damaged, too—and would have sunk except for rescue by one of the Navy's ocean-going tugs. These sturdy ships are vital units of the Fleet, constantly on the alert to hold down our losses by towing crippled ships to bases where they may be repaired to fight again.

Submarines and tugs of the Navy both use RPM DELO to lubricate their powerful Diesel engines. So do other types of Navy craft. Day in and day out,

RPM DELO in Navy Diesels is meeting and beating some of the toughest lubricating problems in history.

In your Diesels, too, RPM DELO will give dependable protection, freedom from ring-sticking and sludge trouble. No other oil combines its anti-oxidant, cleaning and non-corrosive properties. Switch now to RPM DELO.



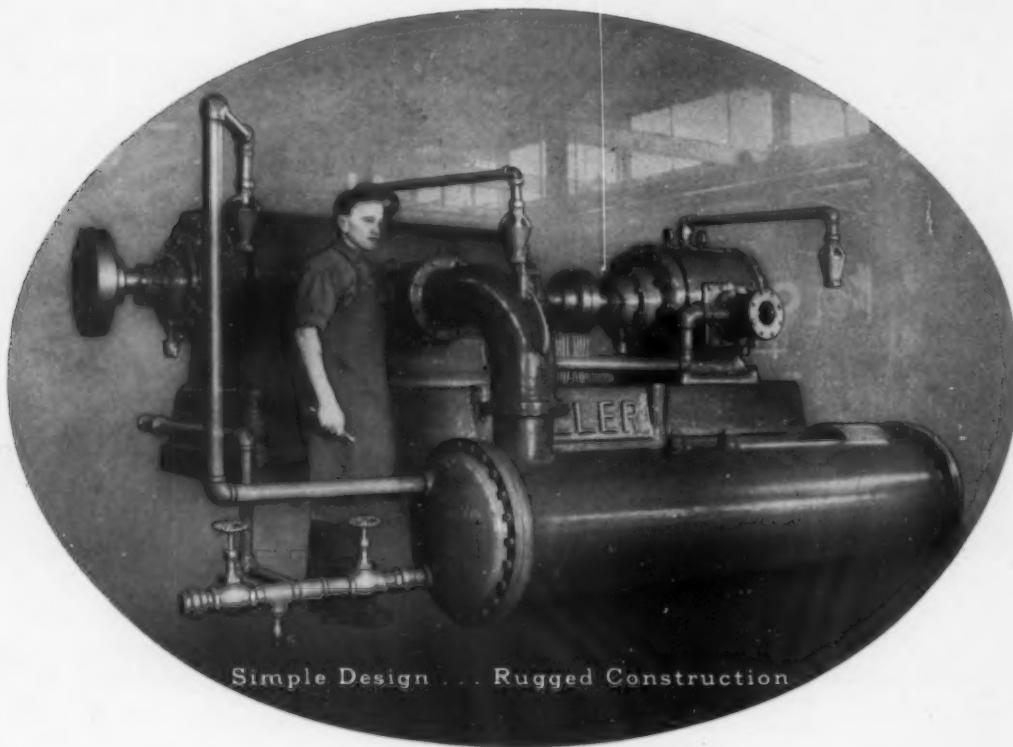
ORDER RPM DELO
FOR YOUR DIESELS

RPM DELO is marketed under the following names:
RPM DELO • Caltex RPM DELO • Kyso RPM DELO
Signal RPM DELO • Imperial-RPM DELO • Sohio RPM DELO CONCENTRATE

Ask your Diesel engine manufacturer or distributor for the
RPM DELO supplier in your vicinity

STANDARD OIL COMPANY OF CALIFORNIA

Depend on FULLERS for Continuous Production



Simple Design . . . Rugged Construction

FULLER Rotary Compressors and Vacuum Pumps show very fine records for long, continuous operation. This is due, in a large measure, to the simple design and rugged construction of these units. They have remarkably few wearing parts—rotor, bearings, blades . . . operation without vibration and air flow free from pulsations.

One of the most impressive features of these units is the extraordinary capacity in relation to size. The shop assembly of the two-stage compressor illustrated, and since installed in an airplane factory, has a capacity of 1665 C.F.M. actual free-air delivery, 125-lb. pressure . . . occupies approximately one-half the floor space required for most types of machines of comparative capacity.

Become better acquainted with Fullers. Send for Bulletin C-5, illustrating and describing these machines. It's yours for the asking.

C-82

**FULLER COMPANY . . . CATASAUQUA . . . PA . . . CHICAGO
SAN FRANCISCO**

F U L L E R
PIONEERS OF HIGH-EFFICIENCY ROTARY COMPRESSORS

FULLER-KINYON, FULLER-FLUXO, THE AIRVEYOR CONVEYING SYSTEMS . . . FULLER FEEDERS AND DISCHARGE GATES . . . AIR-QUENCHING COOLERS . . . ROTARY COMPRESSORS AND VACUUM PUMPS . . . BIN SIGNALS . . . DRY PULVERIZED-MATERIAL COOLERS



**What Happens
When a
V-Belt Bends**



FIG. 1



FIG. 2

433

**If you care about
better V-Belt performance**

MAKE this SIMPLE TEST!

Take any V-belt that has *straight* sides. Bend that V-belt while you grip its sidewalls between your fingers and your thumb—as shown in the large photograph above. As the belt bends, you will feel its sides *bulge out*—as shown in figure 1 on the left.

Now do the same thing with a belt that is built with the patented *Concave* side. You get a similar change in sidewall shape—but what a *different result*! The precisely engineered Concave side becomes perfectly *straight*—as shown in Figure 2. This belt when bent, exactly fits its sheave groove. There is no side-bulge.

Two savings result. FIRST:—The full side of the belt *uniformly* grips the sheave-groove wall. This means *uniform wear—longer life!* SECOND:—The full side-width grip on the pulley carries heavier loads without slippage. This saves belts and power, too!

Only belts built by Gates are built with the Concave side, which is a Gates patent.

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1090 Bryant Street

*This
CONSERVATION
PLAN*



*will help YOU save
man-hours... save materials...
speed production*

Wartime Conservation means MORE than just conserving copper, steel, aluminum . . . it means the most strategic possible use of all of the ingredients of Victory—materials, manpower, time and ingenuity.

These five major points comprise a complete program developed by Westinghouse for Wartime Conservation. This program packages up Westinghouse engineering experience in the entire field of electric and power equipment and related materials. Examples noted are but five of many specific recommendations.

This experience and these recommendations are offered fully and without obligation. If you are not already familiar with them, consult your Westinghouse representative or send for the book described below. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

J-99478



"WARTIME CONSERVATION," a new 100-page book issued by Westinghouse, contains complete recommendations covering the points suggested here. It will be sent you without cost, on request.

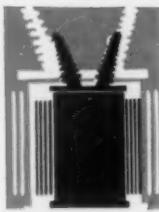


Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

1. Conserve

by strategic selection, application and use of electrical equipment.

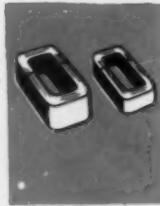


EXAMPLE

Various accessories will produce large increases in capacities of existing equipment, with a small use of critical materials. For instance, either air-cooling or oil-circulating equipment can increase transformer capacities up to 30%. Use of both can add as much as 60%.

2. Conserve

by utilizing new developments that reduce need for critical materials and man-hours.



EXAMPLE

Hipersil®—a new electrical steel—increases the flux-carrying capacity of transformer and similar cores, large and small, up to 35%. Weight and amount of critical materials can be reduced as much as 50%.

3. Conserve

by utilizing available facilities for preventing breakdowns and reducing machine outages.



EXAMPLE

"Maintenance Hints"—a complete, pocket-size manual covering recommended upkeep practice for electrical apparatus—is a maintenance help available without charge. Check your Westinghouse representative for copies.

4. Conserve

by utilizing materials which in many cases can replace critical materials and do a better job.



EXAMPLE

Prestite—a new pressure-molded porcelain which can be solder-sealed to metal—is replacing bushing assemblies requiring rubber or gaskets to keep out moisture, in many types of electrical apparatus.

5. Conserve

by tapping all sources of salvageable scrap.



EXAMPLE

Systematic planning can uncover many ways of reclaiming worn equipment and waste material. Samples of salvage forms and organization charts in use in Westinghouse plants will gladly be made available on request.

* Registered trademark, Westinghouse Electric & Mfg. Co., for HIGH PERmeability SILicon steel. ,

SYMONS CONE CRUSHERS

Used for Fine Reduction Crushing of

MANY ORES AND INDUSTRIAL MINERALS



A large industrial cone crusher machine with a conveyor belt above it. The machine has a hopper at the top labeled "FEEDER NO.2". The conveyor belt is positioned above the crusher. The background features a circular arrangement of mineral names.

ABRASIVES
ASBESTOS
BRICK
CADMIUM
CARBIDE
CEMENT CLINKER
CHROMIUM
COPPER
DOLOMITE
FELDSPAR
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GANISTER
GRANITE
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GOLD
IRIDIUM
IRON
LEAD
LIMESTONE
MAGNESITE
MANGANESE

MATTE MERCURY
MOYBDENUM
NITRATE NICKEL
PALLADIUM
PLATINUM
PYRITE
QUARTZITE
RADON
RHODIUM
ROCK ASPHALT
SANDSTONE
SHALE SILICA
SILVER
SLAG SINTER
TIN
TRAPROCK
TUNGSTEN
URANIUM
VANADIUM
WOLFRAMITE
ZINC

Operations which include fine crushing of these and similar materials can best be done with Symons Cones as is being demonstrated wherever finely crushed materials are produced in quantity.



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The Care and Maintenance of Rock Crushers



Only Universals feature strong, light, streamlined bases.



No. 3 of a series of advertisements in the interests of national economy and to aid those users of crushing equipment unable to secure new units during the emergency.

The "Do and Don't" of Crusher Lubrication

Today lubrication is more important than ever before. Lack of grease can cause costly bearing failures and bearings are made of vital, much needed alloys.

These ten simple rules, strictly observed, will help your crusher to stay on the job until the day when parts are plentiful and new crushers obtainable.

1. Don't keep lubricant containers near crushing plant—as float dust is penetrating and a little grit in your grease may ruin a bearing.
2. Don't put oil or grease in bearings or fittings until they have been wiped off with clean rags. Flush them with a thin oil—don't use kerosene.
3. Use only clean containers.
4. Make it a practice to inspect bearings often—at least four times daily with bronze bearings; once daily with roller bearings—checking them for over-heating.
5. Don't use cheap lubricants—they cost more in the long run. Use only tested lubricants as indicated on name plate.

6. Place a burlap bag saturated with crank case drainings on top of the lower end of the toggle—it helps keep out dirt and lubricates the lower toggle seat.
7. Keep adjustment wedges and screws clean. Oil regularly to prevent rust. Unless already enclosed, wrap screws with cloth, tied on, to keep out grit.
8. Squirt out a shot of grease from gun before greasing to clean nozzle.
9. Don't over-oil or grease. Too much lubricant can overheat bearings. Bearings have to "breathe" but should be able to contact grease. Use thinner lubricant in cold weather. Notice oil level plugs or name plates indicating quantity to use.
10. Don't keep adding oil when it should be changed. Changing gets rid of any dangerous accumulation of dirt.

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CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADER ROLLERS, PORTABLE ASPHALT PLANTS

A POWER SHOVEL



The design and operating advantages that made money in peace times can and are helping to speed defense in war times. And in reverse, the performance of machinery in war times can teach a lesson to peace time operators.

Take Northwest for instance—Northwest Simplicity—few shafts, few gears, simple arrangement! This means easier assembly in far away ports, easier upkeep—easier understanding on the part of green men!

There is a time coming when you will be able to get Northwest again! When that time comes, the competitive angle is going to be a little tougher. Northwest simplicity and ease of upkeep is only one of the many features Northwest will have for you that will keep the production curve steadier and make pit operation more successful. Buy war bonds. And watch and plan for a Northwest after the "Duration."

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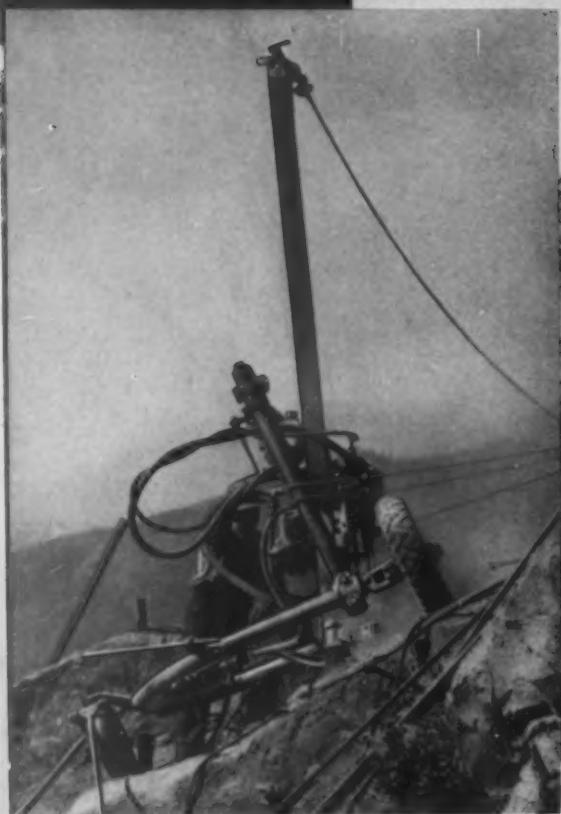


NORTHWEST

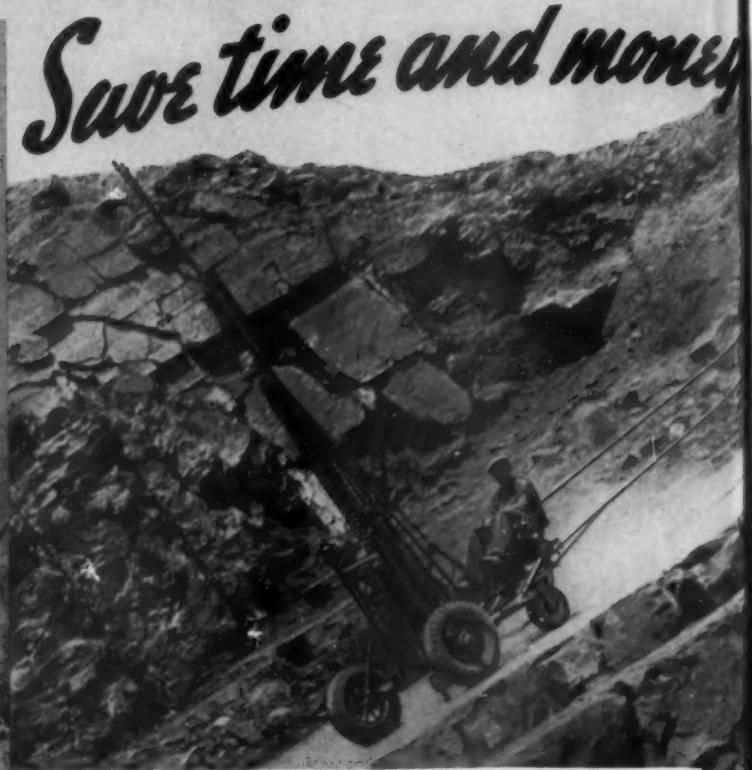
AFTER VICTORY BUY NORTHWEST

FM-2

FLEXIBILITY and DEEP-HOLE DRILLING POWER



One of 42 FM-2 Wagon Drills used on this job. The ease with which they can be set up, regardless of the ground, speeds up the work.



This quarry lies at a 43° angle. The flexibility of the FM-2 Wagon Drill cuts drilling costs. A small I-R air hoist mounted on the unit moves it up and down the incline.

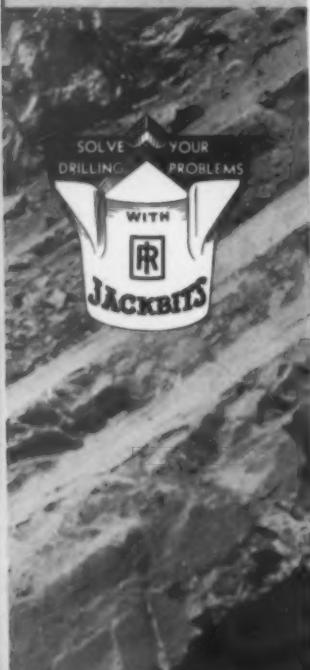
The flexibility of the FM-2 Wagon Drill permits its use in all kinds of ground. Holes can be drilled at any angle—wherever you want them. A fast, convenient, portable method is thereby provided for using the powerful Ingersoll-Rand X-71 WD drifter drill. Twenty-foot steels are handled easily. Set-up time is reduced and time spent changing steels can be cut in half, so that more footage is drilled in a shift.

The X-71 WD drill used on the FM-2 has been developed especially for wagon drill service. The piston has a long stroke. It hits a heavy hammer blow which has a unique follow-through characteristic so essential for deep-hole drilling. In addition, the drill has powerful rotation and is capable of blowing holes easily to great depths.

Performance records from countless jobs prove that this combination of the specially designed X-71 deep-hole drill and the highly flexible FM-2 three-wheel mounting drills more feet of hole, day in and day out.

KEEP 'EM DRILLING

Ask your supplier for an oil that meets I-R Specification 433
—the new rock drill lubricant developed by Ingersoll-Rand.



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He helps his MANY brothers



HE BELONGS to a large family of wonder workers. They are men of faith who perceive not only the difficulties, but ways to surmount them.

The Oldest Brother of the family is more than 5000 years old.

His business is to destroy—from as far off as he can, as swiftly as he can, while keeping his own as safe as he can. His inventions are marvels of speed and might.

He is now more active than ever before. His name is Military Engineering.

A Younger Brother works on the machines of destruction and in the factories that make them.

He is a youngster, something over a century old. He built the steam engine, machine tools, the internal combustion engine. His name is Mechanical Engineering.

He founded this company 50 years

ago. Here under the name of Rex Mechanical Engineering—Rex M. E.—his major task now is to provide his Oldest Brother with combat material and means of making it.

As in the years of peace, Rex M. E. still designs . . . manufactures . . . applies . . . sells and maintains chain belts for handling material and transmitting power.

He has work in plenty, not only for the Oldest Brother but for all the great Family of Engineering who serve American industry in war and in peace.

While working to bring V-Day nearer, Rex M. E. is learning many things that are helpful now—and will be afterwards—for handling materials and transmitting power.

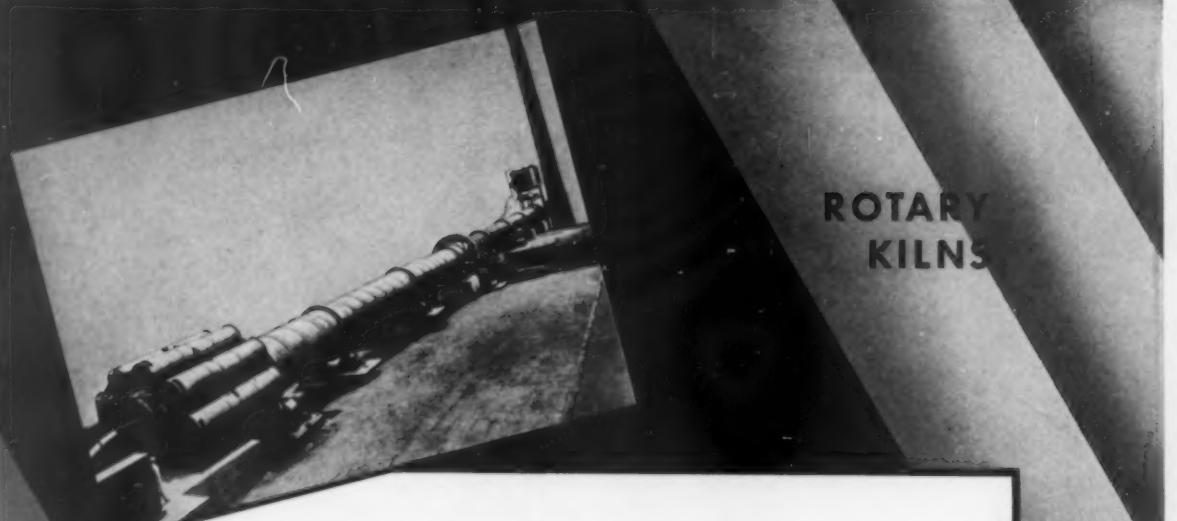
For complete information write Chain Belt Company, 1649 W. Bruce Street, Milwaukee, Wisconsin.



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*In more than 2000 sizes and types
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CHAIN BELT COMPANY OF MILWAUKEE



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Machinery for Cement-Lime-Ore

In addition to a complete line of Rotary Kilns and Grinding Mills, F. L. Smidth & Co. also manufacture Coolers, Pre-Coolers, Pre-Heaters, Recuperators, Air Separators, Agitators, Packers, Extractors, Feeders, Burners, etc. and their auxiliary equipment, for the manufacture of Cement, Lime, Ores, and Allied Products



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Handle with Care

-it's got to last!

THIS year your wire rope must be made to last as long as possible. It must do more work. Must work longer hours. It must deliver more service than ever before. Only with proper care can this be accomplished.

American Tiger Brand Wire Rope has long life and service built into it. No other rope will last longer under tough usage. Or is easier and safer to use. But even a quality rope like U·S·S American Tiger Brand requires care and attention to give the maximum service and top efficiency required right now.

Send for this Free Booklet

Every user of wire rope can get a lot of good ideas from this informative book. It's packed with easy-to-follow instructions. Pocket-size, handy and thoroughly practical, "Valuable Facts" will help you avoid common errors of handling and care that shorten rope life. Order as many copies as you need. Get them into the hands of the right men. Never forget—wire rope is indispensable to the war effort—you've got to make it last.



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-TAKE THIS OPERATION - for example

★ In this quarry, seventeen Dempster-Dumpster heavy-duty bodies, of 3 ton capacity each, go through continuous, around-the-clock loading while only three trucks, equipped with Dempster-Dumpster Hoisting Units, are constantly on the move hauling loaded bodies five-eighths of a mile to dumping point and returning empty bodies for more loaded ones . . . an endless cycle of efficient top-production, low-cost service.

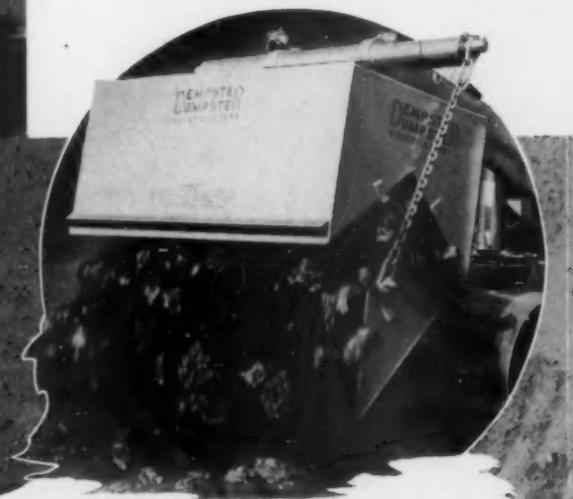
The Dempster-Dumpster system of haulage is recognized by progressive rock, cement and lime plants, from coast to coast, as essential standard equipment for minimum production cost.

But the Dempster-Dumpster is even more necessary now than ever before. One unit often eliminates 3 out of 4 trucks in previous service . . . and that means cutting costs to the bone. It means eliminating much equipment investment. It means cutting maintenance costs . . . tire and gas requirements . . . but most important now, it means increased production with a minimum of manpower.

This particular type of body may not fit your particular need, but there's a Dempster-Dumpster body that will, whether the material to be hauled is heavy, light, dust or liquid.

Our engineers are available to help you meet today's material handling demand. Write for our 75 page Manual on "How Others Are Using the Dempster - Dumpster to Advantage." Dempster Brothers, Inc., 343 Springdale, Knoxville, Tennessee.

DEMPSSTER DUMPSTER





HERE'S THE WAY THEY DO IT IN OLD KENTUCKY



One of the Cleveland DR30 machines
as set up at the 18-foot x 40-foot face.

THIS limestone producing property in central Kentucky had a problem. The overburden was too heavy for economical removal. So they opened up underground operations by sinking a shaft 7 x 22 feet in size to a depth of 265 feet. The mine is worked by the room-and-pillar method, Cleveland DR30 Wagon Drills being used, two in a heading, the face being 18 feet high x 40 feet wide. Sixteen holes are drilled by each machine, as per the round shown in drawings below.

They gained these advantages by wagon drill operation:

Much quicker and easier to set up, as compared with using tripods.

Six-foot steel changes can be used as against 3-foot changes with the ordinary guide shell.

Much easier labor on the drill operators.

The 18-foot ceiling is drilled without benching.*

There is very little secondary drilling, and the ultimate yield is expected to be about 3 tons of stone for a pound of explosive.

*Similar holes are being drilled in other properties to depths of as much as 30 feet.

Let our engineers help you in working out profitable drilling methods in your quarry or mining property. Bulletin 132 gives full information on Cleveland Wagon Drills. Bulletin 122 covers Hand Sinkers. Did you receive your FREE copy of our Driller's Handbook?

THE CLEVELAND ROCK DRILL CO.

Subsidiary of The Cleveland Pneumatic Tool Co.

CLEVELAND, OHIO

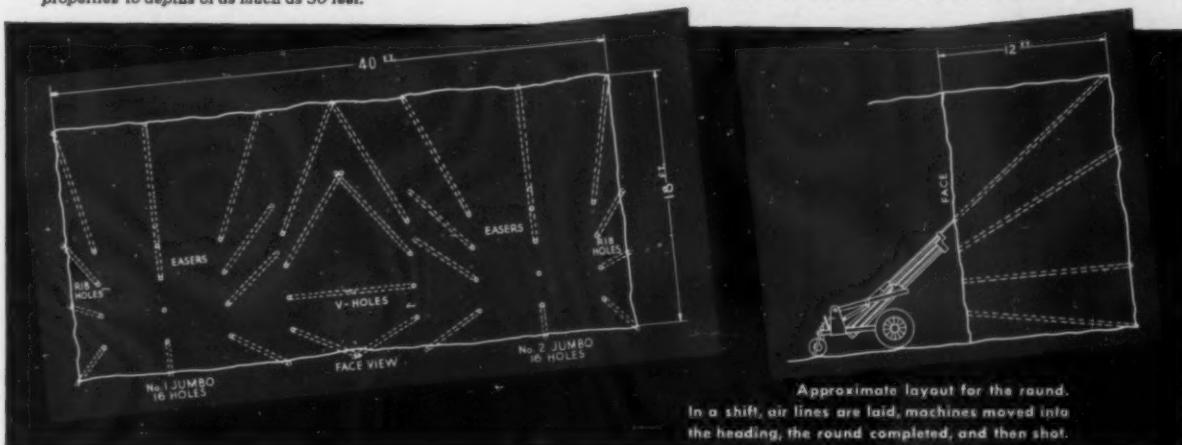
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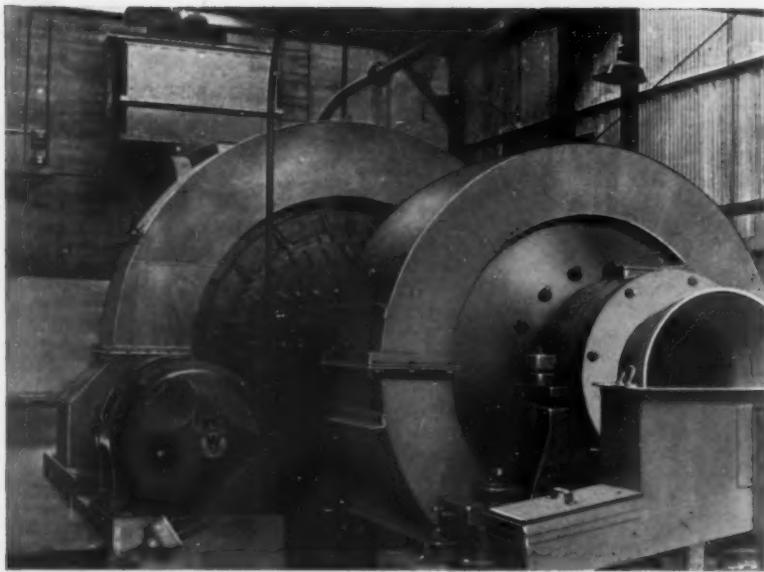
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A Rod Mill That Aligns the Rods

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The conical ends of the Hardinge Rod Mill keep the rods in alignment at all times, regardless of character and size of material being ground—

Provides space at end of rods for free feed and discharge.

Has variable discharge levels.

The conical ends form heads of great inherent strength.

Write for Bulletin 25-A which describes the phenomenon of rod alignment.

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You who use this friendly, long-life wire rope here at home can imagine what it would mean to you. Old side kicks who used to work with you are now in distant parts. If ever dependability counted in wire rope, it's doubly vital there. So when a Wickwire-rigged Liberty Ship gets through to them, and from its cargo unloads this reel with the friendly, trusted name, you can be sure it brings cheers.

The boys out there came from every American industry. They know that *you* need Wickwire Rope, too. So they're mighty thankful when you make what you have last longer,

so that more can be spared for new shipping and for *their* heavy work along the fronts.

But when you do need more wire rope, please order it without reels, if lengths will permit, so our boys can have this greater convenience. Will you? Wickwire Spencer Steel Company, 500 Fifth Ave., New York, N.Y.



First Maritime M and Victory Fleet Flag in all New England was awarded to Wickwire for outstanding production achievements.

DO YOUR MEN UNDERSTAND STRETCH?

The free book, "Know Your Ropes," tells them just what to expect, and what to look out for. In addition it pictures splicing methods, life-extension rules, etc. This book can save you money—and save wire rope for the war fronts. Send for your free copy.

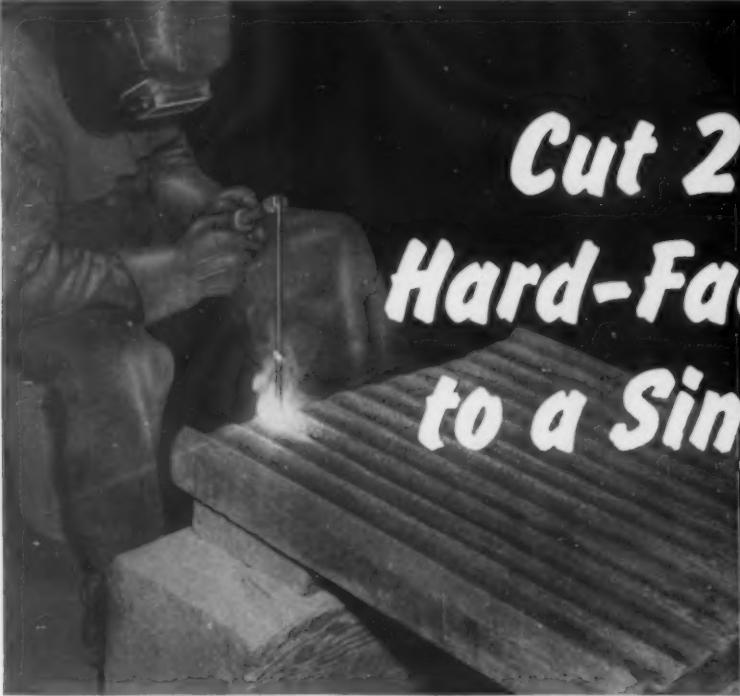
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Cut 2 Layer Hard-Facing Jobs to a Single Pass

Bare Electric Stoody Self-Hardening Saves Time, Makes Heavier Deposits, Eliminates Scaling Operation and Saves Electrodes

HARD-FACING deposits on crushers and other heavy equipment should be at least $\frac{3}{8}$ " thick—and $\frac{1}{4}$ " deposits are even more desirable. To obtain this depth with coated rods, the job must be done in two passes and thoroughly scaled between each.

In contrast, Bare Electric Stoody Self-Hardening deposits, in a single pass, a full $\frac{1}{4}$ " layer of hard metal, cutting the welding time as well as eliminating the irksome scaling operation.

Unlike most bare rods, Bare Electric Stoody Self-Hardening is easy to apply. The arc is readily maintained and spatter is held to a minimum. In addition to being economical from the viewpoint of cost and speed of application, Bare Electric Stoody Self-Hardening is also highly resistant to wear and will withstand severe impact.

These combined qualities make Bare Electric Stoody Self-Hardening superior to all others for hard-facing Crusher Jaws, Sand Pump Casings, Impellers, Swing Hammers, Jaw Crusher Plates, Gyratories and Roll Crushers.

Stoody's new Wall Chart shows typical hard-facing applications on Gyratories, Jaw Rolls, Tractor parts, Dippers and other fast wearing parts. To obtain a copy, a request on your letterhead should be addressed to Engineering Department.



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STOODY HARD-FACING ALLOYS
Stop wear... Eliminate Repair



AMERICA'S WAR PRODUCTION DEPENDS ON TANKS LIKE THESE

Take a good look at these huge spherical tanks. Chances are your hose, your belts, your packings may come from them or from others just like them.

These are used for storing butadiene in the first of the synthetic plants operated by U. S. Rubber Company . . . a second will soon be in production.

Having worked in the field of synthetic rubber since 1921 we know what uses each of the five basic types of

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Our booklet on synthetic rubber will give you much valuable information. Send for your copy.

Mechanical Goods Division

UNITED STATES RUBBER COMPANY

ROCKEFELLER CENTER • NEW YORK



We take lessons from you

Chan!



ivan mankoff

YOURS is a weary task and a bleak existence, Chinese friend, as you toil on a highway for the inhuman Japs. They think themselves your masters—but they're not! For they can't enslave your soul, or break your patience, or kill your will for final victory. We take a lesson from you, Chan, as you look down the highway where victorious armies will march—your armies and ours.

For the war is over here, too—on sea and land, above and below. In open pit mines and quarries skilled men are drilling and blasting coal and ore and stone with which a war is won.

To speed the work of these determined men, and to provide for their safety, the Ensign-Bickford Company is manufacturing Safety Fuse and Primacord-Bickford Detonating Fuse.

Victory Begins Underground!

D-P

THE ENSIGN-BICKFORD CO.
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**Primacord-Bickford
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ROCK PRODUCTS

*If it's Rock
you're Hauling*



KOEHRING DUMPTORS ARE YOUR BEST BET

Here is good pictorial proof that Koehring Dumptors can haul and dump rock of any reasonable size and come speeding back for more. Wide body opening means easy loading, and gravity dumping is instantaneous. The massive chassis easily withstands the shock of constant heavy duty service. Koehring Dumptors will save you valuable time too, with three speeds in either direction, quick load spotting and dumping up to the edge of the fill. Haul rock faster with a Koehring Dumper.

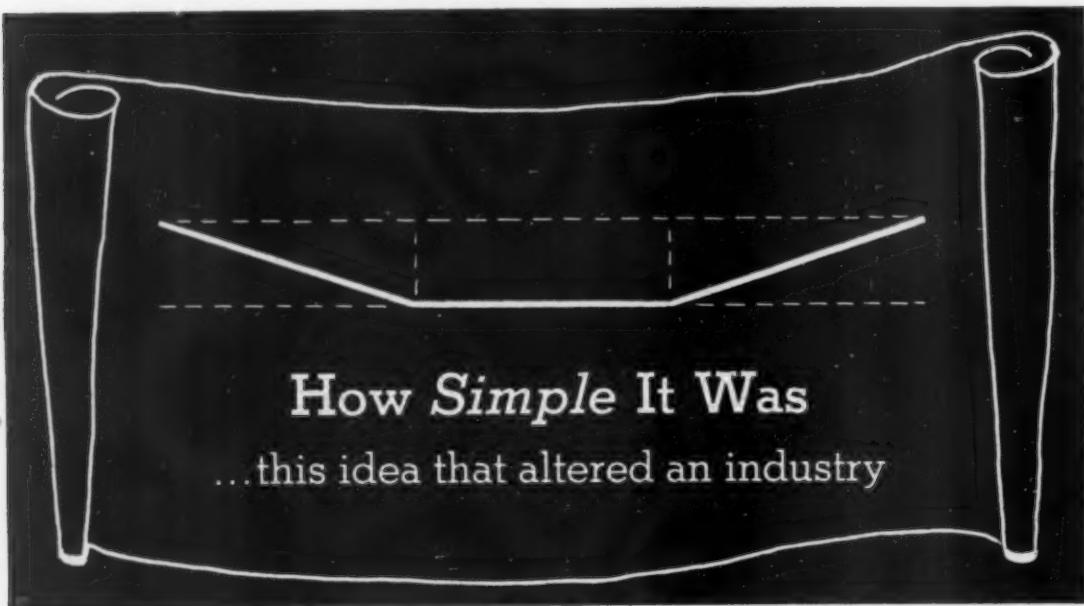
Your Koehring Dumper will last much longer with proper lubrication and care... depend on your Koehring equipment distributor and use genuine Koehring parts.

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HEAVY-DUTY CONSTRUCTION EQUIPMENT



Long the Leader . . . Ever a Pioneer



How Simple It Was

...this idea that altered an industry

MIRACLES are usually modest; they seldom clamor for attention. Yet their effects can sometimes change an entire industry.

At least, that is what happened when Thomas Robins developed his second invention. Having made the first belt created especially for conveying materials, Mr. Robins was still not content. He felt that further improvement was necessary . . . that a belt running flat was wasteful; it carried only a limited quantity of material and usually dropped much of that material along the way. So his fertile mind attacked this second problem.

The First Troughed Belt Conveyor. The first step was to try running a belt in a trough formed by spool-shaped idlers. As could be expected, the varying diameters of the spools caused friction which quickly destroyed the underside of the belt. Then Mr. Robins invented the Troughing Idler so common today—cylindrical pulleys set on angle brackets to raise the sides of the belt.

The present firm of ROBINS has an extensive department devoted to the manufacture of all types of Idlers: Troughing, Training, Rubberdisc and Return. All types possess the customary ROBINS qualities: efficiency, economy, endurance. Careful buyers—everywhere—prefer them.

ENGINEERS • FABRICATORS • ERECTORS
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For Material Aid in Materials Handling . . . It's ROBINS

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"Man Is What He Eats"

If you, your wife or your cook are attempting to learn something about "point rationing," probably you have seen or heard often: "Man is what he eats." That is the title of a popular booklet containing descriptions of vegetables with tables of what and how much vitamins and minerals they contain. Thus, we are becoming conscious of the elements of nutrition; and this should mean business for producers of rock products.

Why? Because producers of rock products are grinding up the rocks of the Earth's surface, and ground-up rock is soil. Soil is the most vitally important mineral in the world because it feeds us. We can exhaust our stores of coal and petroleum and yet survive, but if we ever exhaust the soil there will be nothing left alive but stunted plants.

This catastrophe won't happen suddenly, but is happening every day, so gradually that we are too often unaware. Wise men have been calling attention to inexcusable waste of our soil resources for the past two or three generations, but only in the last few years has much of anything been done about it. Even more recently have men of science begun to correlate breeds of domestic animals and men with their climatic, geographical and geological environments. They now know that many diseases and deterioration of both animals and men stem from mineral as well as vitamin deficiencies.

Had mankind continued to live in isolated localities, on the produce of the soils there, we should by this time have men of pronounced local characteristics; but fortunately extension of transportation and modern processing and wide distribution of food products have made few localities dependent solely upon their own products. However, the time has about come when there are no virgin new soils to tap, and when careless agriculture will have drained long cultivated soils of most of their store of minerals, or robbed the soil of its organic contents by which these minerals are made available for plant food.

The agricultural lime or limestone producer is almost universally recognized (at least by scientific men) as provider of an absolutely indispensable mineral for soil fertility. For him, in this single issue of Rock Products, on the following pages, is new, interesting and useful proof. Here are fresh arguments, both to sell the product to farmers and to sell the U. S. Government and its various agencies on the absolute necessity of continuing the program of soil enrichment and conservation.

Regardless of war, we cannot afford to falter in the soil building program so admirably started. Moreover,

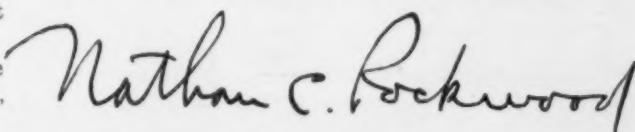
the war's demands for larger crops and more animal products cannot be met without more generous use of lime than has hitherto been the case. We are not saying this; the foremost agricultural experts in the United States are saying it in the pages which follow.

Our bodies contain besides calcium, phosphorus, potassium, sodium, chlorine, sulphur, boron, magnesium, iron, iodine, fluorine, silicon, manganese, cobalt and copper. Each plays some part in our metabolism, and deficiencies often produce startling diseases and deformities. The role each one plays is yet unknown, but from experiments and experience in animal husbandry it would appear that life is not possible without them all.

Plants can suffer a long time from lack of soil minerals, but necessarily their nutrient values and ash analyses change; spinach, for example, is not good because of its calcium and iron content simply because it is spinach. Grown on soils deficient in these minerals it will still be spinach, but eating it won't serve the purposes it is supposed to serve as an article of diet.

Limestone is never pure CaCO_3 . It usually contains numerous mineral elements in small amounts. The soil may need and probably does need these just as much as calcium. Instead of depreciating impurities, the lime or limestone producer might capitalize them. However, too frequently the producer doesn't know what a really adequate analysis of his limestone shows. While silica and alumina are the commonest and largest impurities, painstaking analyses of limestones often show small percentages or traces of almost any mineral found in sea water; and a chemical analysis of our own blood is very close to that of sea water. Lime in the soil also has the faculty of stimulating chemical activity, by bacterial means or otherwise, thus setting free minerals otherwise locked in the soil.

Producers of all crushed rock might well investigate the possibilities of using it in pulverized form as a source of soil minerals. Trap rock, for example, while about half silica and alumina, is rich in many mineral elements. Of course, the fertilizer chemist would say these are in insoluble form. Finely ground, with lime in the soil, they may be available as rapidly as plants need them. Producers of trap rock and granite may find it desirable to explore this possibility. These minerals certainly would be more valuable to mankind spread on the fields than in quarry waste piles.



HINTS AND HELPS

Pan Collects Spillage

AT THE CARBON LIMESTONE CO.'S quarry near Youngstown, Ohio, the shovel works on a bench that is lower than the track haulage system.



Shovel is used to lift "pan" containing stone spillage in loading cars

This bench is about 22 ft. high, and requires a shovel with a longer stick or boom than in most operations. It also makes it difficult for the shovel operator to dump the bucket load so as not to spill some on the side opposite to the shovel.

To overcome this difficulty, each car as loaded is spotted opposite a steel pan that rests on the ground and any spillage of rock falls into this pan. From time to time, by means of chains that are attached to the corners of the pan, its contents can be lifted by the shovel tooth and dumped into a car.

Braking an Inclined Cableway with Solenoid

By ROY C. NEWHOUSE

Chief Engineer, Crushing, Cement and Mining Machinery Department,
Allis-Chalmers Mfg. Co.

THE ARTICLE ON p. 30 of February ROCK PRODUCTS "Mine Hoist Motor Serves as Generator and Brake" is very interesting and reminds me of a similar but somewhat more simple installation which we made in 1916 at the plant of the Casparis Stone Co., east of Connellsville, Penn. The plant involved then furnished ballast to the B. & O. Railroad.

The quarry and main crushing plant were located on the side of a very steep hill and an aerial cableway was used to transport the crushed stone to the loading bins on a railroad siding at the bottom of the hill.

I was present when the customer interviewed the wire-rope company's engineer regarding the details of the

cableway. I questioned the high price for the brake and was informed that the brake was very expensive, not only because it had to be very large but also because it had to be water-cooled to dissipate the heat transmitted to the brake in absorbing the work produced by the descending loaded buckets.

I told this engineer that I was not posing as a fully qualified electrical engineer, but that I was sure that if we installed a large enough motor on the system, acting as a synchronous generator instead of an approximately 10-hp. motor to start operation of the cableway with unloaded buckets, any standard brake would be sufficient and that the braking effect could even be taken care of with a standard solenoid brake on the motor shaft.

I immediately consulted our Electrical Engineering Department and was informed that the use of such a motor was entirely practicable.

The final result was a much simpler system than that described in the February article.

Instead of a 10-hp. motor for starting the system, we furnished a 65-hp. plain squirrel cage induction motor with solenoid brake. A plain

cage motor is safer than a wound-rotor motor because the resistance in the rotor is fixed. We used an across-the-line starter so that full voltage would be delivered to the transmission line with the cableway fully loaded. Under these conditions, the maximum speed of the motor with buckets fully loaded was about 4 percent above the synchronous speed. If the current supply failed for any reason, the brake was immediately applied by the weights on the solenoid brake. On standard large mine hoists, whether manually or automatically operated, weight is considered the safest braking method.

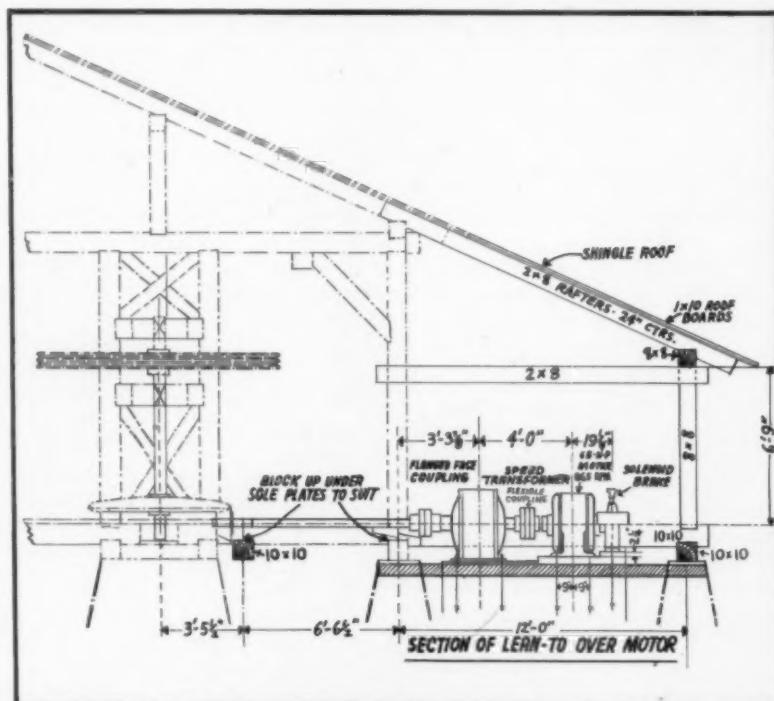
I am enclosing a drawing, which shows the installation of the motor, solenoid brake and speed reducer direct coupled to the countershaft of the cableway system.

In my opinion, the most definite advantages of the Casparis Stone Co. installation are:

Maximum safety by the use of a weighted brake when current fails.

No danger of overspeed because the resistance in the rotor circuit is fixed.

Especially in times like the present, a standard squirrel cage induction motor can be used.

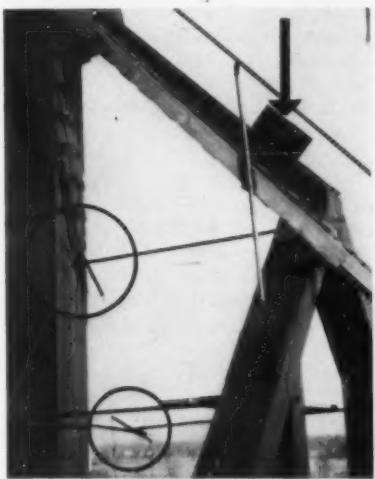


Solenoid brake with 65-hp. squirrel-cage induction motor controls movement of cableway

HINTS AND HELPS

Chute Control

AT A SOUTHERN concrete products plant, sand and other aggregates are delivered by rail. The aggregates are dumped to a track hopper serving a high bucket elevator. There are four bins, each provided with a spout from the bucket elevator. To set the butterfly gates for each bin would require the operator to go outside, and up to the top of the building were it not for the resourcefulness displayed by the builders of the plant; they have extended the handles of the butterfly valves back to the edge of the building and then by means of a cross arm and ropes, all gates can be set from the main floor below. The arrow points to the



Cross arms and ropes control butterfly gates in chutes

vibrating device (made in their own shops) for prevention of build-ups in the chutes.

Quarry Water Handling Method

A LARGE LIMESTONE FLUX QUARRY located in one of the eastern states has a bed of stone about 22-ft. thick so when 500 tons of stone per hour is handled, the area of such a quarry when spread over a period of 20 years or more becomes large. Everything from compressors to pumps must have some degree of portability. At this operation one scheme is to back fill a part of the worked out quarry with debris removed as overburden. This acts as a dirt filled dam and partitions it off from the active working face of the quarry. Water in the active portion is pumped to this sump where it is



Water from active part of quarry is pumped behind dirt dam (seen in background) and pump boosts accumulation over rim of quarry

boosted over the rim of the quarry by one of several 4-in. centrifugal pumps. At this operation there are a total of six pumps: one 8-in. and one 10-in. Worthington, two 6-in. Deming and three 4-in. Swabe pumps.

The smaller pumps are mounted on metal framework as shown in the illustration.

Movable Surge Bin

THE METROPOLITAN SAND & GRAVEL CORPORATION, Port Washington, Long Island, N. Y., is using an 160-cu. yd. surge bin or field hopper. As shown in one of the illustrations, this field hopper may be relocated very easily. One of the ore cars has four hand-operated ratchet hydraulic screw jacks, one mounted on each top corner, which are turned up to bear against 12- x 12-in. timbers under the hopper. The hopper is resting on four steel matts attached to each of the four columns. When raised, it is moved by the locomotive to a new location, probably a distance of

40 ft., in about 20 minutes time.

It will also be noted that on each side a roof supported by timbers serves to deflect any spillage away from the track so that there will be no interference to train movements. The roof also serves as a protection to workmen standing near the bin.

Heavy Motor Cover

IN A CRUSHED STONE PLANT whose main output is flux stone, and where roughly 65% of its output is in the 1½- to 7-in. size of stone, special precautions are taken to protect the motors from dust and the accidental dropping of large stone. The cover over the motor shown in the illustration is 3/16-in. steel plate, making



Heavy cover protects motor from dust and rock

it unlikely that any damage will befall this motor from any reasonable cause.



Field hopper or surge bin fed by dragline from stockpiles may be easily moved to a new location by jacking up on top of ore car pulled by locomotive

NEWS ABOUT PEOPLE

Heads Asphalt Institute

BERNARD E. GRAY, chief engineer of the Asphalt Institute, has been promoted to the position of general manager, adding the duties of that



Bernard E. Gray

office to those already held as chief engineer. Mr. Gray has been with the Institute for the past 13 years. Born in Andover, Mass., he was graduated from Tufts College with degrees of B.S. in Civil Engineering, later receiving honorary degree of C.E. He is the author of numerous technical articles on design, construction and maintenance of highways and airports. Herbert Spencer was re-elected president of the Institute.

Joins Marines

THOMAS L. WELLS, editor of *The Explosives Engineer*, has been given a leave of absence to join the United States Marine Corps as a Volunteer Specialist. He has received a commission as First Lieutenant. Mr. Wells, a graduate of Harvard and of the Colorado School of Mines, has had extensive mining experience in the United States, Canada, and Latin America. He became a member of the

staff of *The Explosives Engineer* in February, 1941, and served as associate editor until November, 1942, when he was appointed editor.

Mineral Resources Board

HOWARD I. YOUNG, president and general manager, American Zinc, Lead and Smelting Co., St. Louis, Mo., and also American Limestone Co., Knoxville, Tenn., has been appointed director of a new Mineral Resources Coordinating Division in the War Production Board. He has also been made chairman of two committees, the Minerals and Metals Advisory Committee, and the Mineral Resources Operating Committee. Mr. Young has spent most of his career in the mining industry.

Association Director

C. D. SHAW, JR., of the Southern Cement Co., Birmingham, Ala., has been named a director of the Alabama Association of Credit Men.

New York Geologist

JOHN G. BROUGHTON, instructor in structural and engineering geology at Syracuse University, has resigned to become assistant state geologist of New York State.

Chief Operations Officer

MAJOR CHRIS J. SHERLOCK, president, American Road Builders' Association, is now chief operations officer for the Skagway, Alaska, district of the U. S. Army Engineer Corps. He was formerly stationed at Denver, Colo., where he was assigned as operations officer immediately after receiving his commission last June.

Resigned

MR. AND MRS. ROBERT L. QUAIT have resigned from the Limestone Products Corp. of America, Newton, N. J. Mr. Quait was director of research and sales and his wife was his secretary. She had been with the company 17 years, while Mr. Quait went with the company 16 years ago. They

were married in 1940. For the time being, Mr. and Mrs. Quait are taking a vacation before he undertakes the activities of a new affiliation.

Supervises Ready Mix

ROSCOR VANCE has been named by Tru-Mix Concrete Co., Medford, Ore., to direct construction on its contract valued at \$133,416, to grade and surface 8.3 mi. of the Evans Creek-Same Valley access road in Jackson County, Oregon.

Retires

MISS FLORENCE L. DUTCHER, of Collingswood, N. J., for 45 years a member of the personnel of the Camden Lime Co., Camden, N. J., has retired from active service. As a tribute to her long service to the company Miss Dutcher was presented with a radio at a testimonial dinner given by her fellow employees. Among those present was Frank B. Hineline, president of the company.

Returns from Guiana

WALTER R. CUMISKEY, former superintendent of the Nassau Sand and Gravel Co., Roslyn, L. I., N. Y., and of its successor, the McCormack Sand and Gravel Corp., has returned to this country after completing a job on a large airport in British Guiana, S. A. His home is in Port Washington, L. I.

Enters the Navy

LEA P. WARNER, JR., who has been in charge of employee relations of The Warner Co., Philadelphia, Penn., and editor of Warner-American News, has been given a leave of absence for the duration to serve as a Lieutenant, J.G., U. S. Navy.



Lea P. Warner, Jr., Lieut. J.G. U.S.N.R.

NEWS ABOUT PEOPLE

Lieutenant Warner graduated from Penn Charter School, Philadelphia, in 1928, and received his engineering education at Cornell University. He also studied commercial law and accounting at the University of Pennsylvania.

FRANK CADMAN, who has been Mr. Warner's assistant for two years, will take charge of all supervisory work and personnel control matters.

In the Air Forces

W. R. BENDY of Claverack, N. Y., who has been in business for the past five years as a consulting cement engineer, is flying as a service pilot in the Army Air Forces. After graduating from an A.A.F. Advanced Flying School last summer, he spent several months as a gunnery pilot in Nevada and as a bomber approach pilot at a bombardier training school in New Mexico. He is now flying as a ferry pilot in the Air Transport Command. Lt. Bendy says that his business as a cement engineer will have to be discontinued for the present, but he expects to return to it and renew contacts with his old friends in the cement industry as soon as the war is over.

Study Illinois Taxes

T. E. MCGRATH, vice-president, McGrath Sand and Gravel Co., Lincoln, Ill., and G. A. THORNTON, vice-president, Ottawa Silica Co., Ottawa, Ill., are members of the State and Local Taxation Committee of the Illinois Chamber of Commerce for tax modernization in Illinois.

In the Army

RUSSELL N. THATCHER, formerly geologist and engineer with the Johns-Manville Corp., has enlisted in the U. S. Army and is now serving as a Private at Camp Breckinridge, Ky.

With P.C.A. Products Bureau

JOHN A. RUHLING, formerly associated with the Milwaukee district office of the Portland Cement Association, has been appointed assistant manager of the Cement Products Bureau to take the place of E. W. Dienhart who resigned to become the full-time executive secretary of the National Concrete Masonry Association.

Mr. Ruhling comes to his new work with a wide acquaintance among concrete products men. For the past nine years, he has been very active

in the Fox River Valley area of Wisconsin, comprising 12 counties, with headquarters at Appleton. As field man for this territory he spent considerable time in the promotion of highways, sewage plants, storm and sanitary sewers, manufacturing and industrial plants, and housing proj-



John A. Ruhling

ects. This work required numerous contacts with state, county and city officials, plant managers, contractors, architects and engineers, home builders, building and loan officials, and concrete products manufacturers.

He has had a wide experience in engineering work and construction.

Heads Roads Committee

CONGRESSMAN J. W. ROBINSON of Utah has been named chairman of the House Roads Committee. A member of this committee since 1933, he succeeds Oklahoma Representative Wilburn Cartwright, who was not reelected. The new chairman is well known to members of the highway profession and industry because of his frequent appearances at conventions and meetings of the American Road Builders' Association.

Made Superintendent

NELSON C. WHITE is magnesium chloride superintendent of the Texas plant of International Minerals & Chemical Corp. Mr. White was educated in the chemical engineering department of Rhode Island State College, and joined International from a position as production manager of Fields Point Mfg. Corp. of Providence, with whom he had been associated for 15 years.

Man of the Year

THEODORE MARVIN, advertising manager, Hercules Powder Co., Wilmington, Del., has been selected industrial advertising's "Man of the Year" for 1942 by *Industrial Marketing* magazine. The award was based on the year-round high standard of Hercules advertising directed to the chemical industries.

Elected Director

LEWIS G. HARRIMAN, president, Manufacturers and Traders Trust Co., Buffalo, N. Y., has been elected a director of the National Gypsum Co., according to an announcement by the company's president, Melvin H. Baker. Mr. Harriman's election fills the vacancy created by the death of William G. Houck, who was president of the Buffalo Structural Steel Corp.

Heads Public Relations

JOHN SWENHART, formerly manager of the advertising department of the Atlas Powder Co., Wilmington, Del., has been appointed director of a new unit known as the advertising and public relations department. F. J. Harty has been named director of industrial relations and service.

In the Navy

CYRUS D. SMITH, formerly field engineer for Morrison-Knudsen Co., Inc., and lately resident engineer on construction of the Permanente Co. magnesium reduction plant at Los Altos, Calif., has been commissioned an ensign in the Civil Engineer Corps, U. S. Navy.

R. L. GUINASSO, accountant for the Calrock Asphalt Co., San Francisco, Calif., is a cadet in the U. S. Navy. W. C. Jones, sales engineer, is a Lieutenant Colonel in the Coast Artillery, and Clarence Gomez is in the Navy.

Joins Allentown

PHILIP B. MYERS, formerly with the Valley Forge Cement Co., Catasauqua, Penn., is now assistant plant superintendent of the Allentown Portland Cement Co., Evansville, Penn.

Resigned

ALFRED N. MILLER has resigned as assistant to the chief engineer of the Canadian Allis-Chalmers Co. to accept a position with the Aluminum Co. of Canada, Montreal.

SAFETY

Sand and Gravel Producer's Methods Pay Dividends

By JOE L. ROE

FOR as long as I can remember, "SAFETY" has been a habit with me. It started with safety training in the home which made such an indelible impression on me that preventing accidents has become my hobby.

After December 7, 1941, I put my hobby to work. At the plant we were asked to double our production. This meant greatly enlarging our organization, both as to personnel and equipment. Expansion was demanded at a time when many of our skilled workmen were leaving for the armed forces or to take jobs in war plants. We could obtain delivery on only a part of the needed machinery. There was only one answer: If new men were to be trained and make-shift equipment used, certainly an intensive safety campaign must be a part of the program.

We started to work. First we read all the articles we could find in the magazines for our field which had to do with safety campaigns, better safety methods, and the relation between employees and management in promoting safety.

Next we wrote each employee a let-

ter. In that letter we frankly outlined what doubling our production meant in accident hazards. We explained that in order to meet the requirements which had been placed on production, every employee must work every day. Accidents must be elim-

● In 1933, Mr. Roe became the superintendent of the Victory Sand and Stone Company plant at Topeka, Kans. For ten years "Safety" has been Joe L. Roe's hobby. Since December, 1941, he has put that hobby to work, and with surprising results.

inated at the plant and also they must be eliminated in the home. We stressed this point as to the home. Figures on accidents in the home were quoted—30,000 deaths annually from accidents at home—around 5,000,000 accidents in homes each year which caused layups from work.

In this letter, which was mailed to the employee's home address, we asked for a reply. We stated that we wanted ideas and we wanted cooperation. No safety program can work unless the employees and the management form



Safety Ideas box. U. S. Defense stamps are the prizes given each week

a partnership towards that end. We admitted that and asked for suggestions for such a partnership.

All but two employees answered this first letter. And they came through with some sound ideas for a campaign. From a study of these letters and the information we had obtained from the magazines in our field, we started to work.

Safety Idea boxes were put up at the plant. Forms were printed for filing safety ideas. The first sentence on these forms read: "Take these sheets home with you."

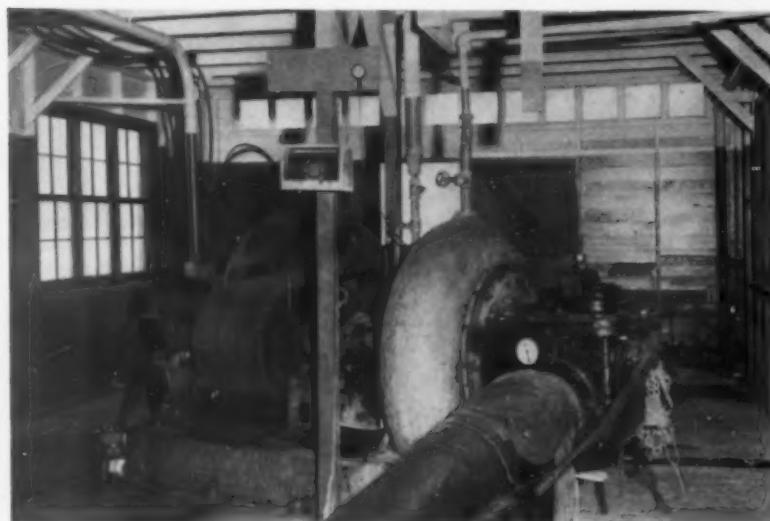
In a second letter to all employees, to which were attached several blanks for filing safety ideas, we announced our prize contest.

War Stamps for Safety Prizes

Prizes in War Stamps were to be given for safety ideas which were used or filed for later use. The prizes were to run from 50c to five dollars in stamps. Each employee was asked to file at least one safety idea per week. Selecting War Stamps as prizes served a double purpose.

We encouraged our employees to buy War Stamps, and we tied in our safety campaign with something which was being more widely advertised in the press and over the radio than any other one thing in the country.

The idea took hold immediately. And our hopes for having our safety campaign begin in the employee's home became a reality. We could tell



Power unit on new dredge boat. Note speaker system on post in foreground which is part of the safety-first program

SAFETY

from the suggestions and letters from employees that safety was becoming a general topic of discussion. Since the second letter we have been averaging one safety idea per employee per week. Of course some do not deposit safety ideas but others bring in more than one.

Awards are announced on the bulletin board. However, the War Stamps are not given out at the plant, but mailed to the home.

As to results from the campaign, our record speaks as the greatest endorsement. In 1942 we had no employee absent from work because of an accident in the home. At the plant we had no serious accident to workmen or equipment. We have had no employee absent from work because of an accident injury in our plant.

Our production record also is something of a record. We have delivered 85,000 cu. yd. of sand, rock and gravel, and nearly 50,000 cu. yd. of ready mix concrete. Ninety-five per cent of the production of our plant has been delivered to firms with war contracts.

As to what part of the success of our production can be fairly credited to the working of our safety campaign and the establishing of a partnership between employees and management, of course, it is impossible to say. I know that it had a part, and I know, too, that it was responsible for many better methods and practices by the management.

To make such a campaign a success requires more than the encouragement of the employees and giving prizes for safety ideas. Those ideas must be studied, and the good ones (and believe me, there have been plenty of good ones), put into operation.

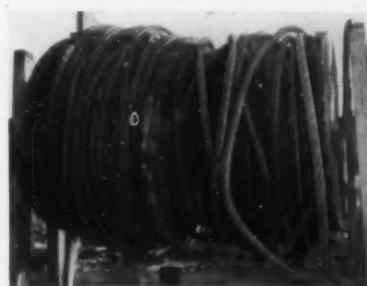
The ideas cover as wide a field as our business itself. Not long ago we constructed a new boat and dredge for our river operations. Over 50 prize winners—ideas which suggested real improvements in safety prac-



Seventeen safety ideas were used in building the controls on the dredge boat. All plant employees were asked to inspect the finished job and note the safety ideas

tices—went into the building of that equipment.

Seventeen safety ideas were used in building the controls on the boat.



Two reels of second-hand wire rope were purchased in 1942 for use as railings

We did this work ourselves and all plant employees were asked to inspect the finished job and note the safety ideas which we had put to use. This is in line with our policy of making safety a partnership habit to include every employee.

A good number of the safety ideas offered have been ones which we formerly used, but because of the difficulty in buying new equipment, and our stepped-up production requirements, had been overlooked.

We use around 8000 ft. of wire cable in our plant. In 1937 we changed to all preformed because we found that it gave us much better operation results and also longer life. And the preformed served us better in its second use as railings and guards.

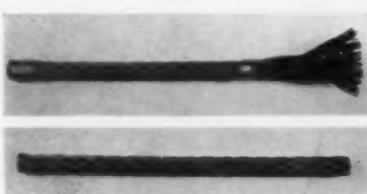
But in 1942 we purchased 1200 ft. of ordinary or standard rope. We used 300 ft. of it for needed railing along the barge walk. The same week

the ordinary cable was put into use as a railing, five safety suggestions were filed regarding the accident hazard from snagged and torn hands. Result: We paid out four dollars in awards, switched the 300 ft. of railing cable to guy duty, and put in its place, 300 ft. of retired preformed rope.

A careful examination of the ordinary rope which had been purchased showed hardly a foot without dangerous snags and wires which had "porcupined." This condition does not exist with the preformed, even after it has seen hard, high speed duty. There may be just as many broken wires but the preforming tends to hold them in place and prevent handling accidents to hands or clothing.

One of our employees made quite a study of this porcupining. We have short samples of both types of rope at the plant, on the table near the bulletin board. When the seizing is pushed back from the open end of the ordinary rope, the individual wires flare with considerable force. An examination of a section of worn standard lay cable will show the same thing happening with each broken wire. The preformed, of course, holds its position as to individual wires without being seized. And, the same thing happens when a single wire is broken.

Recently an ice jam played havoc with a part of our plant. This situation resulted in a bad condition of the steps leading down to the boat pumping station. Several years ago we had a similar trouble caused by ice. At that time several employees were in-



Above: A section of ordinary wire rope showing how individual wires flare. Below: Preformed wire rope without seizing. Individual wires do not flare, and when used for hand railings there is less tendency for wires to "porcupine," causing injuries

SAFETY

jured. Not in line of duty, but just the same we had the accidents.

This year we had the former unfortunate record to serve as a prompter, and besides, we had several safety ideas on file to remind us. All employees were stopped from going near the damaged steps until the immediate accident hazard had been removed.

Operators who are familiar with our type of sanding operation, know the difficulty in keeping the plant clean. Cleanliness has always been an ally for my safety hobby, and I've always believed that a plant cleanup program went hand in hand with a safety program. We have had many fine safety suggestions which pointed the way to a cleaner plant, and as a result, a safer one.

Formerly we had a great many accidents on steps, both the conventional stairs type and step-ups from one level to another. All of our steps have been made full safety steps and most of the step-ups have been eliminated. While we were working on these before the inauguration of our present safety campaign, a number of safety suggestions in this line have brought about permanent improvements.

Intercommunication System Promotes Safety

Another better operations and safety idea coming from an employee suggestion was our speaker system. We have installed an intercommunication speaker system with speakers on the boat, at the dredge, at two points in the main plant and at the general office.

In working with the boat and dredge, orders and instructions must be put into operation with great speed. This is true for safety's sake more than for operation efficiency. Formerly we relied on a phone. I would say that this one safety idea alone has paid us in operation benefits many times more than the total spent on our safety ideas campaign.

Our prize winning safety ideas have included many suggestions for improvement in tools and guards as well as operation check suggestions which have meant longer life for equipment plus the elimination of the safety hazard.

However, we feel that the biggest asset is the near 100 per cent partnership between employees and management which has been established because of the safety ideas plan. We did not expect such a response.

AUTHOR'S NOTE: In the January, 1943, issue of our magazine, Rock

PRODUCTS, J. J. Gorman, President of The Zanesville Gravel Company, tells of a "Safety Saves Sorrow," campaign, with cash prizes for those lucky months without an accident. Thanks to Mr. Gorman and Rock Products, we are considering adding this idea to our own campaign.

Greenstone as a Safety Appliance

By OLIVER BOWLES¹

A GREEN METAMORPHIC ROCK consisting essentially of actinolite and chlorite is quarried at Lynchburg, Va. As no common rock name is applicable, it is generally designated "greenstone." For the past 14 years the rock has been quarried and fabricated for various purposes, including the manufacture of spandrels, trim, coping, stone veneer, base courses, chimneys, flagging, floor tile, stair treads, and stair landings.

Study of the rock's structure indicates that the chlorite crystals nearly parallel in micalike layers, giving the rock a schistose or banded appearance. The actinolite crystals are scattered irregularly throughout the chlorite matrix, both as to spacing and direction.

The character of the rock surface varies considerably, depending on the direction in which the stone is cut. When cut parallel to the schistosity, the "rift-grain" surface obtained affords attractive architectural effects.

The Underwriters' Laboratories, Inc., sponsored by the National Board of Fire Underwriters, has made a comprehensive study of this material, and the tests conducted gave such favorable results in accident prevention that Virginia greenstone antislip material has been designated as Safety Appliance 854.

One important use of this material is for constructing "islands of safety," that is, floor areas in front of machines where operators are likely to slip if preventive measures are not taken. Where greenstone is used as flooring material the danger of slipping is reduced greatly, whether the floor is wet or dry and even though the surface may be oily. The advantages of using such material as stair treads in schools, churches, and other public buildings are obvious. Wider use of greenstone is encouraged by

¹ Published by permission of the Director, Bureau of Mines, U. S. Department of the Interior.

² Chief, Nonmetal Economics Division, Bureau of Mines.

measures taken to avoid accidents from slipping and falling in factories and public buildings.

Canadian Mica Being Developed

WITH REGULAR MICA MINING now under way in the Eau Claire area, 30 miles east of North Bay, Ontario, Canada, operators have been giving their attention to marketing and two processing plants have now been placed in use.

One plant has been set up at Mattawa by Inspiration Mining & Development Co., which is mining mica on holdings optioned from Norman Vincent, Toronto. Another processing plant has been set up at Bonfield by the Amic Syndicate which is using about a dozen girls for cutting and trimming.

Around 100 men are stated to be in the Eau Claire area now either working on producing properties—the Purdy mine, Inspiration, Amic and Mattawa—or prospecting in the general area. About 70 claims have been staked in all.

To facilitate development and effect economies, the Amic and Mattawa Syndicates are to be merged unit for unit into one large company to be formed immediately. The new company will be called Mica Consolidated Mines, it is understood. It will also hold options on other properties in the area and will carry on processing and marketing of mica for others as well as on its own account.

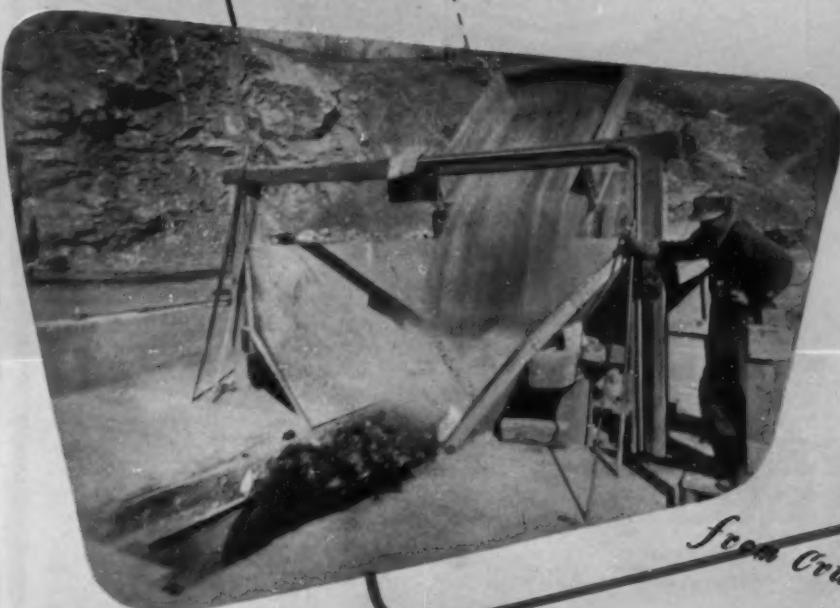
In co-operation with Wesley Block & Co. of New York, a grading and selling subsidiary is being set up in New York City and a New York State charter has been taken out under the name of Verona Corp. Officers have not been elected as yet.

Muscovite or white mica is the product of the Eau Claire region and is stated to be particularly desirable at this time due to the recent difficulty of securing supplies from Madagascar.

Open Dolomite Quarry

ARCHIE HAMILTON, who has operated a dolomite quarry in Cienega, Calif., since 1921, is planning to open a new quarry half a mile east of his old deposit. Plans call for the installation of a new bunker, a crushing plant and belt conveyors. An investment of \$24,000 will be made in new equipment. Raw material is used in the production of magnesium at another processing plant operated by Westvaco Chloride Co.

HELPING TO WIN THE WAR BY USING MORE LIME



"Agricultural Lime"
To Agricultural Ex-
perts means CaO ,
 $\text{Ca}(\text{OH})_2$ or CaCO_3 .
While, editorially, in
Rock Products, we ob-
ject to confusing Lime
and Limestone, in the
following series, since
all forms of liming ma-
terials are often re-
ferred to indiscrimi-
nately, we have not
tried to be precise.
—The Editors

From Crusher to Field



LIME & FOOD

Small Packages for Victory Gardens

A PUBLICITY RELEASE by the Office of Civilian Defense, dated March 3, 1943, reads as follows:

"James M. Landis, Director of Civilian Defense, today urged 'every man, woman and child who can work with a spade, rake and hoe' to plant Victory Gardens as 'a practical defense against food shortage.' His statement follows:

"A practical defense against food shortage is the Victory Garden. This year millions of Americans are utilizing back yards, vacant lots and other suitable plots to grow food for victory. But many more are needed.

"Guidance in the planning, planting and caring for gardens should be available through local defense councils. Many councils already have organized garden committees for that purpose. Local councils can aid in locating garden plots, planning for Victory Garden fairs, providing for the cooperative use of garden tools, and securing for victory gardeners instructional motion picture films and literature."

Lime Not Mentioned in Handbook

To promote this noble work the U. S. Department of Agriculture has issued Miscellaneous Publication No. 483 "Victory Gardens." It contains the familiar advice about a sufficiency of minerals and vitamins in the diet, but in the entire 16 pp. there is no mention of lime or limestone, which furnish calcium and magnesium, two of the most important minerals in the human diet. Calcium, of course, is the most important mineral since there is nearly as much of it in the human body as all the other minerals combined. Moreover, this "Victory Gardens" booklet might have said in all truthfulness that lime or finely pulverized limestone is the most direct and important means of releasing what other minerals there may be in the soil for vegetable use.

An investigation of the merchandizing practice of the industry shows that several lime manufacturers and an occasional pulverized limestone producer have packed their products in 5- 10- 20- and 25-lb. paper bags as well as in the more usual 50- 80- and 100-lb. bags. These small pack-

MORE TO COME

• WE PREPARED a lot more helpful material for this issue of *ROCK PRODUCTS*, but space limitations prevented its use here.

A later issue (probably May) will contain a digest of the promotional literature being used by progressive lime manufacturers.

Also, there will be a review of the equipment available for spreading lime and limestone on the fields. Another article will review limestone pulverizers.

—The Editors

ages are being distributed, apparently, largely through building supply dealers. In a few cases seed and hardware dealers handle them.

We wrote to several of the large grocery chains to find out if they had ever given small packages of lime or limestone consideration. Only one has been heard from, the Great Atlantic & Pacific Tea Co., which said it was not interested in anything but

established "groceries and allied lines." Since the sales of groceries will be considerably reduced by rationing and universal home gardening, it seemed to us that a new line for the home gardener ought to appeal to some enterprising chain store system. In this way lime could become as familiar to the housewife as sugar—that's what it is, "soil sugar." And of course there are many other household uses for lime. Since some bakers are now putting calcium carbonate in bread, maybe the housewife could use a little milk of lime to advantage in other kinds of cooking. Who knows?

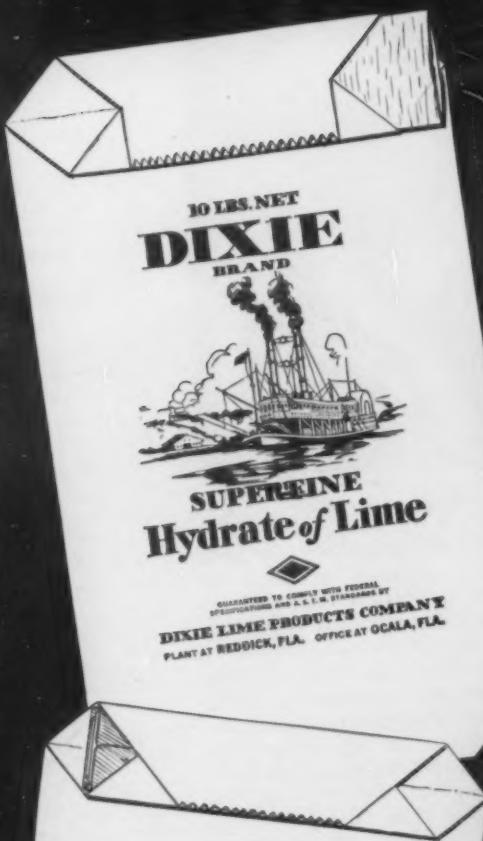
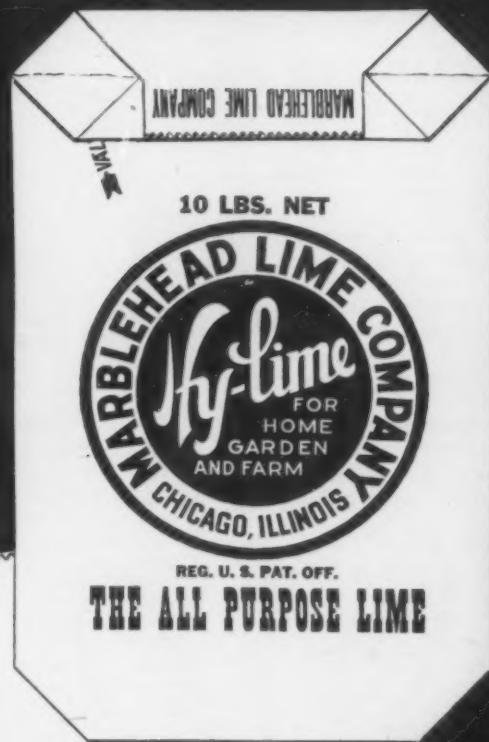
Household Uses

Here, anyhow, certainly is food for thought. Various industries are doing a lot of research and development work in anticipation of the post-war period. With a staple like lime we'll have to use our imaginations a little to find markets to take the place of the present war industries. Maybe a little research on the household market, including merchandizing studies, research in human and animal nutrition at some outstanding institution like Johns Hopkins University, would be money well invested.



Five, ten and twenty-five pound bags of hydrated lime

LIME AND FOOD



Samples of 10-lb. valve-bag packages of hydrated lime for sale to home gardeners



W. H. Pierre

LIMING HAS FOR MANY YEARS been one of the most important soil management practices in Iowa. During the present emergency, it becomes an even more important practice.

Too often we think of meeting our crop production goals only in terms of number of acres in a particular crop. We tend to forget that high acre yields can often contribute more toward total production than can shifts in crop acres. High acre yields also mean less labor and machinery costs per bushel of corn or ton of hay produced, an important consideration during the emergency. By contributing to high acre yields the liming of acid soils assumes an increasingly important role in our all-out agricultural efforts.

Crop Response to Lime

The yield increases that can be expected from liming acid soils in Iowa are shown in Table 1.

TABLE 1—THE EFFECT OF LIMING ACID SOILS ON THE YIELDS OF VARIOUS CROPS

Crops	No. of Crops	Ma-nure	Lime and Manure	Increase for Lime
Corn	255	58.5	63.5	5.0 bu.
Oats	131	48.9	52.6	3.7 bu.
Wheat	22	25.5	28.9	3.4 bu.
Mixed hay	94	1.4	1.7	0.3 ton
Alfalfa	11	1.2	2.7	1.5 tons

These results represent the average values obtained in 51 field experiments conducted on the major acid soils of the state during a period of

*Data on production facilities in Iowa obtained by Dr. A. C. Bunce, Iowa Agricultural Experiment Station in summer of 1942.

Liming Essential for Maximum Production

By W. H. PIERRE
Iowa State College

about 20 years. As is well illustrated, liming increased the yield of all crops. It is especially beneficial, however, in getting stands and in increasing the yield of legume crops, particularly alfalfa.

Each year much valuable legume seed is wasted because of the failure to get satisfactory stands from seedings. Part of these losses can be attributed to acid soils or inadequate liming. With the present shortage of legume seeds and with the increased need of high-protein legume hays, every effort needs to be made to assure good stands of legumes. Moreover, it is only by so doing that we can expect to maintain sufficient nitrogen in our soils to assure high yields of the other crops grown.

Lime Needs in Iowa

Iowa has over 25 million acres of crop land and over 7 million acres of plowable and woodland pastures. It has been conservatively estimated that about two-thirds of the soils of the state are in need of lime, and that the average lime requirement is between 2 and 3 tons per acre. What then can be considered the minimum amount of lime that should be used in the state during the present emergency?

Over 3,000,000 acres are seeded to legumes each year, of which about 300,000 acres are seeded to alfalfa,

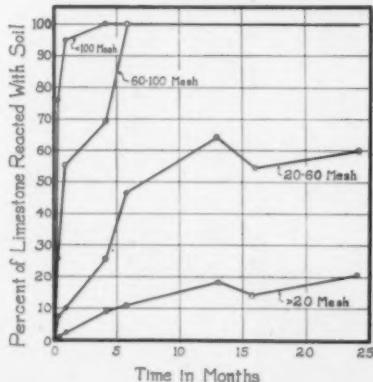


Fig. 1: Rates of reaction of ground limestone of different degrees of fineness with medium acid soils after different periods of time

about 1,000,000 acres to sweet clover, and the remainder chiefly to red and alsike clover. If lime was used at an average rate of 2 tons per acre on 60 percent of this acreage, over 3½ million tons of ground limestone would be required.

Meeting the Minimum Requirements

During the past three years an average of about one million tons of ground limestone has been used annually. Although this represents a marked increase over the previous ten year average, it is still very inadequate. Evidently, then, the use of lime in the state needs to be materially increased during the war period if maximum production of crop and livestock products are to be obtained. A minimum of at least 1½ million tons should be used.

Fortunately, Iowa has an abundance of limestone deposits in those sections of the state where lime is most needed. Moreover, with a reduction in the demand for crushed rock for road purposes, the production capacity of the various plants for agricultural limestone could be increased by 25 to 75 percent.* The major problem in getting the needed amount of limestone on Iowa farms is one of priorities. Both the limestone producer and the farmer are involved.

The difficulty of getting replacement parts, the shortage of labor and of trucking facilities have all been reported as obstacles to getting the needed production. These problems need to be studied further and the necessary action then taken by the appropriate government agency.

Another incentive to greater use of lime would be the making of bigger payments for liming in the A.A.A. program. In addition, an intensified educational program is required in order to insure that the lime produced is used in the areas and on the farms where it is most needed and is applied in the most effective manner possible.

The importance of fineness of grinding is one of the most important

(Continued on page 58)



Earl Jones

WHAT IS THE BASIC REASON why everyone interested in Agriculture should encourage the liming of acid soils? Liming, as needed, profitably increases, directly or indirectly, the yields of all the common crops. The basic reason is more fundamental than this. Liming is *the fundamental practice essential to the improvement and maintenance of soil productivity.*

We do not appreciate as we should the value and necessity of maintaining the productivity of the land. Only recently has the general public begun to realize that this is an important national problem. Many farmers do not, as yet, realize the importance of maintaining soil productivity for the benefit of themselves and their families.

Just what are the advantages of liming in a community where the productivity of the soil has been maintained? The activities of the schools and churches are more satisfactorily maintained with less outside help. Other valuable community activities can be established. The morale of the people is better when the land is productive and the community is a better place in which to rear children.

When the season is exceptionally wet or dry, crop yields are more satisfactorily maintained on productive land. Extra production can be better secured when needed during emergencies like the one now facing us. The future is more secure when the soil is productive.

Just how does liming fit into the picture? The most important factor

A Philosophy About Liming the Land

By EARL JONES

Extension Agronomist, Ohio State
University

in maintaining soil productivity is the regular plowing under of good sods, but this cannot be done unless good stands of hay or green manure crops are secured. Liming is the first step in preparing acid soils for good hay crops and no other soil treatment is completely effective until the lime requirement of the soil is satisfied.

There are other important practices, in addition to liming, which are necessary for getting good stands of hay. The liberal fertilization of the grain crop with which seedings are made, the application of manure on grain crops for the benefit of the new seedlings, the inoculation of legume seeds, the use of adapted strains, and the use of seeding methods which have proven satisfactory in the community must be given attention. This is the year when more fertilizers should be used on the grain crops and the top dressing of wheat with manure on slopes and less productive areas should have a priority on the manure available. All these practices are, however, supplements to the use of liming materials and not complete substitutes for the necessary liming materials. To omit liming is like putting up a good building on rickety foundations.

What Holds Back Use of Lime?

If liming is so necessary and profitable, why hasn't more liming material been used in the past? Several factors account for this. The local dealer has received larger commissions for selling feed and fertilizers than for selling limestone; and he didn't work as hard selling limestone. Liming materials cannot be delivered as conveniently as can feed and fertilizer in bags. Before the advent of trucking, orders for a carload must be gotten together before the limestone could be ordered and then delivery to the farm was difficult. Local dealers were satisfied to sell small amounts of expensive bagged materials. Liming did not, therefore, become a common practice except in communities where enterprising farmers were so much interested in soil improvement that they began to use less expensive bulk materials. In

these communities local dealers became interested in handling limestone, and progress in soil improvement resulted but many rented farms and other farms were not limed.

Marked improvement was noted when the Agricultural Adjustment Administration began offering limestone in lieu of cash payments to participants in its program. Hundreds of farmers who had never used limestone before started a liming program and the use of liming materials really began to assume the place it should in our agricultural program.

Very Necessary To Continue Liming

Our present food situation is likely to continue for several years and it is necessary that we continue our present liming program to the greatest possible extent. We cannot afford to permit soil productivity to decline.

The shortage of nitrogen for use in fertilizers means that the livestock and general farmer must do everything within reason to use home produced nitrogen as wisely as possible. Plowing under good legume hay sods or good stands of legume green manure crops is the most important practice necessary to maintain productivity. Saving the nutrients in manure is also important. This is the year to use more fertilizer than has been used in the past on the grain crop with which new seedlings are made. The wheat should be manured, for the benefit of the new seedlings, on light colored soils where it is not likely to lodge.

Adapted seed should always be used and all legume seed should be inoculated. These practices increase the benefits from liming.

What policies should be followed in 1943 to insure the largest possible use of liming materials? Orders should be placed early and the material accepted whenever it can be delivered. Bids should be accepted for all the suitable materials available and all these bids should be given publicity. If the assignment method of furnishing limestone to a farmer who prefers a certain material helps extend the use of liming ma-

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Farmers Need More—Not Less Lime

AS THE WAR CONTINUES farmers will probably be called on to produce more and more food. In planning for increased production, the need for supplying fertility to the soil for this increased production is often ignored.

A farsighted war-time soil program has to be something more than one of preventing permanent damage to the land by erosion. It must be one that will increase the fertility of worn-out soils and maintain the fertility of improved soils. The backbone of such a program is the use of lime and clovers.

Some have argued that now is the time to "mine" our soils and forget about lime, phosphate, and legumes until after the war; that we should draw on the reserve fertility of our soils and go "all out" on a corn-soybean production program. These arguments overlook the fact that most of our soils have been mined for the past 75 years, and much of the reserve fertility has been mined out long ago. Such a program of mining the soils might, of course, be justified if corn and soybeans were the only essential war crops, and if the greatest need for production were only for the next year or two.

Maximum production of meat and milk will depend upon the maximum

Clovers Are Essential for High War-Time Production

By C. M. LINSLEY

Soils Extension, Department of Agronomy,
University of Illinois



Fig. 1: Time and labor saving equipment will help solve the labor problem

production of food crops, including legumes for hay and pasture. We have been warned repeatedly that this is not a "week-end" war. We

have been asked to plan a war-time production program for the next five years. We have also been told that the American farmer must continue to feed this world for years after peace is declared.

Should we make the mistake of overlooking the possibility of the food situation becoming more critical in 1944 or 1945 than in 1943, we are likely to reap the bitter condemnation of a starving world. It is, therefore, imperative that a great deal of thought be devoted to ways and means of keeping limestone and phosphate moving from the quarries and mines to the farms, and to maintain an adequate legume acreage for fertility and feed. We cannot afford to gamble with the world food supply, either this year or five years from now.

No Magic Way to Boost Production

A super-crop that will produce high yields on worn-out soil, or a high-powered fertilizer that will take the place of lime, phosphate, and clover has not yet been discovered. A war does not change the principles of soil fertility; it still takes the same

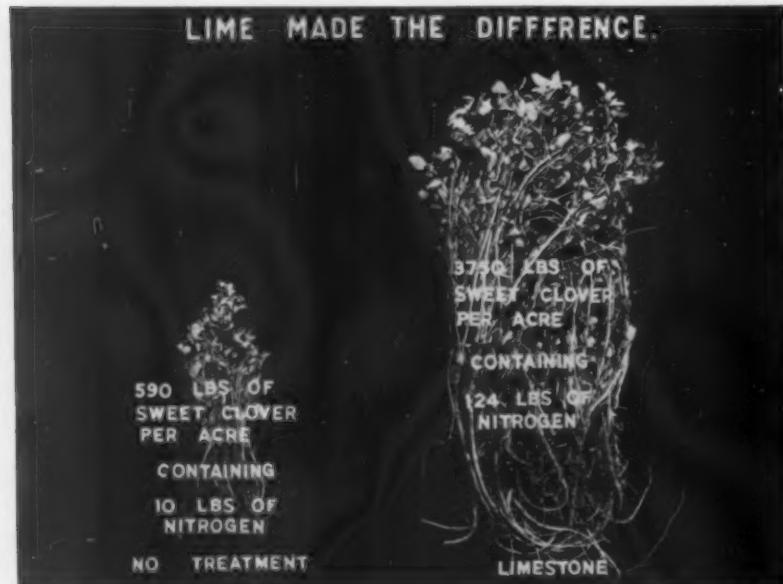


Fig. 2: Limed sweet clover produced six times as much sweet clover (organic matter) and twelve times as much nitrogen as the unlimed sweet clover

LIME AND FOOD

kind of fertility to produce crops. There is only one way to increase total production and that is to put into the soil more of what it takes to produce high crop yields. A sound and permanent system of soil fertility, that has doubled production on thousands of Illinois farms during peace time, is not very spectacular, and it does not carry much war-time glamour, but it is the program that will have to be depended on to de-

of Agriculture, the county agents, and the farm organizations.

As a result of the longtime soil improvement program carried on in Illinois, thousands of farmers have built up the fertility of their soils and are now prepared for maximum war-time production.

A recent survey shows that these farmers have used 21,000,000 tons of liming materials to lime 7,000,000 acres of acid land. Since the first ex-

because Illinois farmers have never depended on commercial fertilizers for their nitrogen. They have produced cheap home-grown nitrogen fertilizers through clovers and other legumes. Therefore, the restrictions on the use of nitrogen fertilizer during the war will not interfere with the war-time production of farm crops in this state. However, any restrictions on the production and delivery of needed limestone and phosphate will limit the production of legume nitrogen, which in turn will limit food production.

10,000,000 Acres Need Lime

While the 7,000,000 acres of farm land have been limed and are growing clovers and are now prepared for maximum production of food, there are still some 10,000,000 acres of acid crop land and about 3,000,000 acres of acid pasture land producing at only about 50 percent capacity. This land must be limed if it is to produce its share of war-time food, and little can be done to increase production on this land until it is limed.

The critical fertility materials in food production on these unlimed soils is nitrogen and organic matter. These soils are low in nitrogen and cannot deliver the large amounts of this element needed by crops. In order to produce 100-bushel crops of corn (grain and stalks) the soil must be able to deliver to the roots 150 pounds of nitrogen in an available or usable form. Legumes, such as clover and alfalfa, are the only practical source of the large amount of nitrogen needed for a high war-time production.

Clover supplies some 70,000,000 lbs. of nitrogen over every acre of land. This nitrogen is one thing that is still



Fig. 3: This farmer is boosting wartime production by plowing under a heavy growth of sweet clover for his corn crop

liver the food. Illinois farmers realize that there are no short cuts to high war-time production. They know that clovers must be grown to add fertility and to supply feed; and they know that acid land must be limed, and low phosphorus soil must be phosphated. This is demonstrated by the fact that they used about 2 2/3 million tons of limestone during the first year of the war. They also used twice as much rock phosphate as during any previous year.

Seven Million Acres Prepared For War

A nation that neglects to prepare its soil for war during peace time is at as serious a disadvantage as a nation which fails to prepare its armed defense. Because soils that have been drained of fertility through years of hard farming cannot be built back to maximum production over night. Fortunately, this and other states have gone a long ways towards soil preparedness during the past 40 years. This soil preparedness has been made possible through a long-time research program of the Agricultural Experiment Stations and the educational program of the Colleges

periments with limestone were started on ten soil experiment fields in 1902, the use of limestone has increased from 122 tons in 1906 to 950,000 tons in 1929, and to 2,670,000 tons in 1941.

Along with this extensive use of limestone, farmers are growing a total of more than 2,000,000 acres of sweet clover, red clover, and alfalfa,

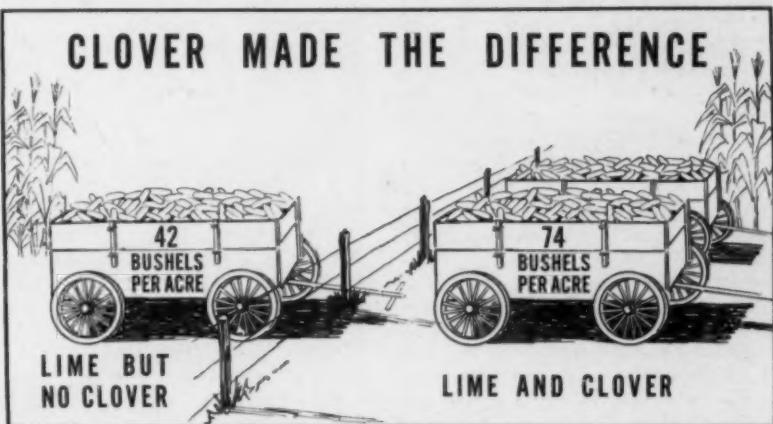


Fig. 4: Sweet clover, a cheap homegrown nitrogen fertilizer increased the yield of corn 32 bushels an acre on the Carlinville Soil Experiment Field. (4-year average)

LIME AND FOOD

free and is not rationed except as the farmer rations it himself by failure to provide inoculation and lime and phosphate where needed.

If our acid farm land is to produce the heavy crops of clover needed to feed the soil and livestock, and to control erosion, lime and in many cases phosphates, must be applied. Ten pounds of nitrogen added in unlimed sweet clover would be equivalent to about one ton of manure to the acre, while 124 lbs. of nitrogen in limed sweet clover would be equivalent to about 12 tons of manure to the acre.

Farmers Need Help To Get Lime

The problem during war-time will not be one of encouraging more farmers to use lime. The real problem will be making it possible for the farmers who already want lime to get it and get it spread on their lands. Before the war we had a "curb service" on lime; about all the farmer had to do was to place an order, the quarry would fill the order, the railroads would deliver the limestone in a few days, and the trucker would haul and spread it on the land. The war is, of course, bound to upset some of our easy convenient peacetime methods of getting our land limed.

The war demands on the railroads will probably interfere with the prompt deliveries of limestone. The same cars that have been used for hauling limestone are hauling war equipment and many of them have now been converted to tank cars to haul oil. This will mean delays in delivery, and many farmers will not be able to get the limestone when their land is ready for liming. However, the most acute problem will be that of finding trucks to haul limestone from the railroads and from the local quarries to the farms and to spread it on the land. During the past several years, practically all the limestone used in this state has been hauled and spread by commercial truckers. The trucks wear out and wear out fast when used to spread limestone, especially on plowed ground. There will be no new trucks to replace them. Many limestone truckers have gone into other lines of trucking, where wear and tear on their tires and trucks is not so severe and where the pay is likely to be higher. The difficulty of finding labor to help with the loading and spreading has discouraged many truckers. Others have stored their trucks and gone into defense work or to the armed forces.

Illinois farmers would and should use 3,000,000 tons of limestone a year during the next three or four years. They know the value of lime-

limited number of trucks available should be saved for hauling from the railroad to the farms and spreading.

A higher scale of prices, that will encourage reliable truckers to continue a lime-spreading service, needs to be supported by farmers and farm organizations. Cutthroat competition by fly-by-night truckers in many sections of the state has reduced rates for this service to a point where reliable truckers cannot compete.

The deliveries of lime need to be distributed more evenly throughout the year. Farmers are now being urged to order limestone early and take deliveries whenever railroad cars and trucks are available.

Liming Philosophy

(Continued from page 45)

terials, all farmers should know about it.

Truck transportation is likely to be the bottleneck and the trucker may object to spreading the material. Spreading on sod fields in the spring and any time after the first hay crop is harvested will help overcome this objection. The farmer must be prepared to spread the material himself, if this becomes necessary. This is not the time to transport very coarse material. In Ohio, materials containing at least 25 to 30 percent 100-mesh material might be more suitable to present conditions than coarser materials.

The cooperation of farmers, the industry, the truckers, and the U. S. Department of Agriculture will be needed this year to get the limestone on the land where it is badly needed. The necessary changes in the program that are needed should be made as situations change.

Cement Laboratory Inspection

THE CEMENT REFERENCE LABORATORY, a joint project of the National Bureau of Standards and Committee C-1 on Cement, A.S.T.M., is planning its eighth inspection tour among cement testing laboratories. This new tour is intended to serve those laboratories which are engaged in, or expect to be engaged in the testing of cement for Federal, State or defense projects. Laboratories in that classification, which desire to avail themselves of this inspection service, should address their request therefor to the Cement Reference Laboratory at the National Bureau of Standards, Washington, D. C.



GOOD SOIL MANAGEMENT is Essential FOR HIGH WARTIME PRODUCTION

Circular 335
University of Illinois - College of Agriculture
Extension Service in Agriculture and Home Economics

Fig. 5: Sample of literature used by University of Illinois, Extension Service to promote good soil management

stone and this value has increased with increases in farm prices. Then, too, they want to invest some of their higher income in the soil; an investment in future security. They know that fertility in the soil is money in the bank.

With the desperate need for food, every effort must be made to see that needed lime is made available to farmers. There are a number of things that need to be done. The government through the W.P.B. and the O.D.T. must recognize agricultural lime as an essential commodity in the far-time food production program and as such, the producers and distributors should have a high priority for replacements and repairs of plant machinery and trucks.

The life of the trucks should be conserved by discouraging long hauls from quarry to farm where shipments can be made by railroad or by livestock trucks on return trips. The

Putting Lime on a War Basis

LIME NOT ONLY chases acid out of soil, but it can be made to serve as a partial substitute for fertilizers as well. Applied in liberal amounts, it speeds up the circulation of air-nitrogen by way of the soil and crop, it greatly reduces the loss in availability of any soluble phosphates that are applied to the soil, and it materially enlarges the feeding zone of crop roots, permitting them to come in contact with much larger quantities of the soil's store of potash. For these reasons, *the production and use of agricultural liming materials merit special consideration in time of war.*

One might assume from what he reads in the papers that acid soils are the results of poor farming. But the acid condition of these soils cannot be laid at the door of America's farmers. Acid soils are the victims of heavy rainfall which, over the centuries, has washed most of the natural lime out of the land and carried it out to sea. In contrast, the semi-arid and irrigated areas of the West are not acid, but alkaline instead.

Bringing the Ocean Salts Back to the Soil

To get the alkali out of soils that contain it is a very troublesome task, whereas correcting the acidity in soils presents a relatively simple problem. All the farmer has to do to get rid of the acid is to haul the lime that the rain has washed out of the land back to the land—not the same lime, to be sure, but other lime that, ages ago, was laid down on the ocean floor and has since been pushed up out of the sea in the form of rock. The limestone quarries of today were the sea-bottom sediments of yesterday.

It is now common practice for farmers to take samples of soil to their county agent, or send them to the agricultural college, for testing as to their need for lime. The term pH is now almost as familiar to the better-informed land-owners as are the degrees which are used to indicate the temperature. In fact, translating low pH readings into pounds of lime required to neutralize an acre of acid soil presents much the same type of problem as that of translating low thermometer readings into pounds of coal required to raise the

By FIRMAN E. BEAR

Soil Chemist, New Jersey State Agricultural Experiment Station

temperature of the air above that acre of land to some desired level.

We are now in position to estimate fairly accurately the amount of lime needed to raise the pH level of a soil to any other level we may desire. As an example, we now know that, for New Jersey, it requires around 500 lbs. of pulverized limestone to raise the pH of the plow depth of one acre of sand from 5.5 to 6.5, about 1000 lbs. to effect the same change in a loamy sand, 1500 lbs. for a sandy loam, 2000 lbs. for a loam, and 3000 lbs. for a silt loam.

Liming Two Plow-Depths of Land

The question which is now uppermost in the minds of those who have to do with the acid-soil problem is that of the depth of soil from which the acid should be driven. To lime merely the plow depth fails to recognize the fact that roots will penetrate to several feet of soil, if the conditions beneath the furrow bottom are such as to favor extended root development. And if the roots can be induced to grow to a greater depth, they have much larger stores of water and mineral nutrients at their disposal.



Blackstone Studios
Firman E. Bear

In a recent study of 20 of the most important soil types in this State it was found that not only the plow depth of soil but the entire profile—clear down to the rock or unconsolidated material beneath—of 70 percent of them was strongly acid and needed to be limed. In fact, the pH values of most of these virgin soils were shown to range between 4 and 5 throughout their profiles. The only exceptions were found in soils that had had their origin in limestone or calcareous shales, or in those to which lime had been applied.

Now, if we must lime two plow depths of soil, we have a good-sized problem on our hands. Yet that is exactly what we are now finding it desirable to do in the intensively-farmed acid-soil areas of the East. This calls for practically doubling the ordinary application of lime, applying around two-thirds of it before plowing the land and spreading the other third over the plowed soil before the seedbed has been prepared.

There is every reason to believe that, if lime were applied at this heavier rate and in this improved manner, the net effect of its use would be to increase the productive capacity of the average land by at least 50 percent. It is apparent, therefore, that such a practice merits wide expansion in the acid-soil areas surrounding the industrial centers along the Atlantic Seaboard. *In proportion as the food shortage becomes serious, more consideration should be given to the means by which the doubling of the rate of application of lime to soils can be put into effect.*

It is poor economy to try to save on lime, and any tendency on the part of those who control the war agencies of this country to talk in such terms should be met by prompt and vigorous action. If we must save on materials and manpower, we would best discard some of our less productive acres and concentrate our attention on the better land, and when we do, the first thing to look into is the pH of two plow depths of soil. If they are both acid, we need lime on both sides of the furrow.

There is an old slogan about liming which reads, "Don't put it off, put it on." If there ever was a time when this adage should be put into full effect that time is NOW.

Limestone Production Around the Clock

Flux stone for steel furnaces no less essential than iron ore. Important by-product of Hillsboro district is agricultural limestone

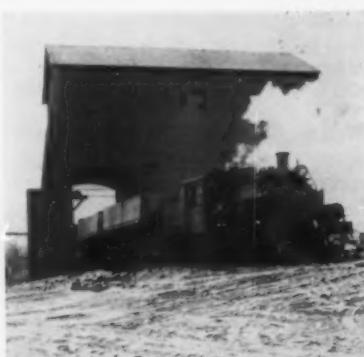
HIGH CALCIUM LIMESTONE is used as a flux in the open hearth furnaces and in the blast furnaces. When the steel industry is booming, the limestone producers enjoy their best business periods. In the Youngstown district there are some 26 blast furnaces in operation that are currently smelting some 11 to 12 million tons of ore per year. Each ton of ore requires roughly one-half of a ton of limestone so the flux stone producers in the area have had to go on a two-shift basis in the quarry—one operator was stripping on a three-shift basis. The tonnage of stone produced is about four times that produced in the same section during the first World War.

Under normal conditions the flux stone industry slacks off during the winter months, but due to the conditions now imposed the stone operators have had to increase their production and to go on a two-shift basis during the winter season. It is tough going to have to produce large tonnages of stone under severe winter conditions, and repairing major pieces of equipment during a snow storm or cold wind has its disadvantages, but these operators are getting out the tonnage in spite of the inconveniences.

Among the quarries in this area are the Pittsburgh Limestone Co.,

By WALTER B. LENHART

Carbon Limestone Co., Lake Erie Limestone Co., the Bessemer Limestone and Cement Co., and the Inter-



Train of quarry cars in Hillsboro flux stone district near Youngstown, Ohio, dumping to crusher. All-winter operation introduced many problems

state Construction Co. The Bessemer Limestone and Cement Co. and the Carbon Limestone are independent commercial producers. The Pittsburgh Limestone Co. is a subsidiary of the U. S. Steel Corporation and the Lake Erie Limestone Co. is a subsidiary of the Republic Steel Corpo-

ration. The outlet of flux stone from the independent operators goes to such companies as the Youngstown Sheet and Tube Co. and the Jones & Laughlin Steel Co.

The stone produced in the area is low in magnesium; too low in fact as a little magnesium is said to improve the character of the slag so that a small amount of dolomitic stone finds its way to the steel furnaces from eastern Ohio. The stone is low in such impurities as sulphur and phosphorous which elements are detrimental to steels. The producers' only problem as regards impurities in their stone is with silica but with a little care in the removal of siliceous overburden or the debris that might be present in cracks in the limestone, the silica problem is not at all serious.

For steel furnace purposes the size of the stone is plus 1½ in. and minus 5 in., but one producer ships stone to its parent steel company up to 7-in. size. The minus 1½-in. material represents about 35 percent of the total rock quarried so its disposal is a problem that each operator has to solve.

One producer ships only fluxing stone. The accumulation of fines is sold to the New Castle Lime and Stone Co. for processing into agricultural limestone and for rock dusting in the coal mines. A second operator produces commercial aggregates during the construction season and, in addition, is probably the largest producer of agricultural limestone in the world. This operator also has embarked into the manufacture of concrete brick and other masonry units.

A third limestone producer makes commercial aggregate as well as supplying its cement plant with cement rock. The fourth producer, during the construction season, produces commercial stone. But in spite of all their efforts the ground storage piles represent large, even vast accumulations with tonnage in the 400,000 ton range for a single operation.



Quarry workmen gather around fire at lunch time

STRIPPING

Removing Large Overburden Tonnage

Thin stone bed in Hillsville district presents a difficult problem of waste disposal

PRODUCING such large tonnages of limestone from beds which average only 22 ft. in thickness means that each day a considerable area of stone must be removed, and, because some of these operations are quite old the worked out portions of the Hillsville quarries represent areas that could be expressed in square miles rather than in acres or square feet.

In all cases the stripings are put back into worked out portions of the quarry. One company uses two end-dump Euclid "Trac-Trucks" for transportation of the overburden with pay loads in the 15-ton range. These units are powered with 150-hp. Cummins Diesels that consume about 25 gal. of fuel per 8 hours. The road beds are kept up with stone screenings. A 2½-

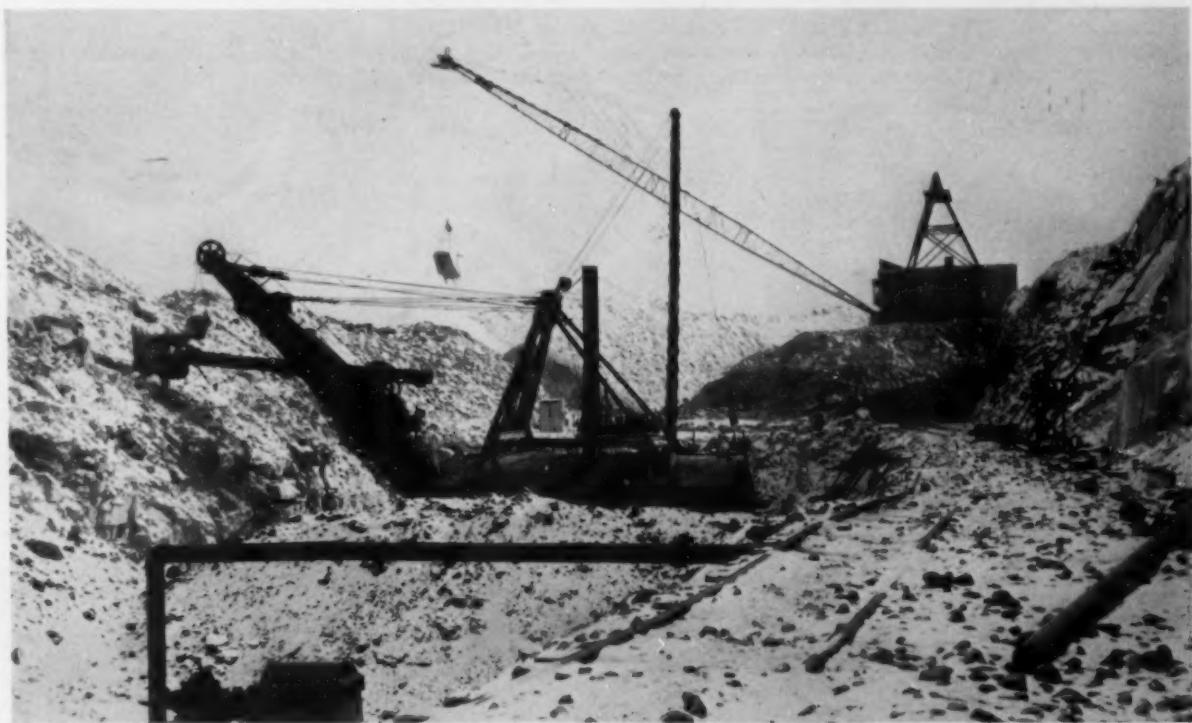
cu. yd. No. 392 Marion Diesel shovel is used on this stripping operation.

Two Types of Drills

The amount of overburden handled by the different companies ranges from a few feet with 40 ft. about average although one operator stripped 80 ft. at one time. The overburden is mostly dirt and can be handled without blasting, but in parts of the limestone the overburden is a siliceous limestone or shale which has to be drilled and shot before it can be economically loaded. One operator uses standard well drilling equipment for this purpose with vertical holes. Another uses a Hardsocg horizontal drilling rig. This is an augur type drill and drills a hole horizontally of sufficient size to receive 4-in. di-

ameter powder. It can augur a hole at about one foot per minute. Horizontal holes are put in every 18 ft., with the hole being bottomed at 100 ft. from the track, thus giving the hole a depth of 80 to 85 ft. The rig is gasoline driven. The drill or augur is made up in sections of 6 ft.

Holes are loaded sometimes with 60 percent gelatine or gelatine No. 3. Eighteen to 20 sticks are put in the back of each hole with 10 sticks farther back. Then six sticks near the collar and 3 sticks at the collar with dirt stemming (in bags) used between each group of powder sticks. Four caps are in each hole which are exploded by batteries. American Cyanamid and du Pont powders are both used at this operation.



Removing overburden from relatively thin bed of stone. In the illustration, the electric dragline is used on the heavier overburden, working from the top of the bank and casting its load across the top of the stripped area. The shovel deposits material in the worked out portion of the quarry

STRIPPING



Large steam shovel uses a 5-cu. yd. bucket to cut a swath 100 ft. wide with a 95-ft. boom

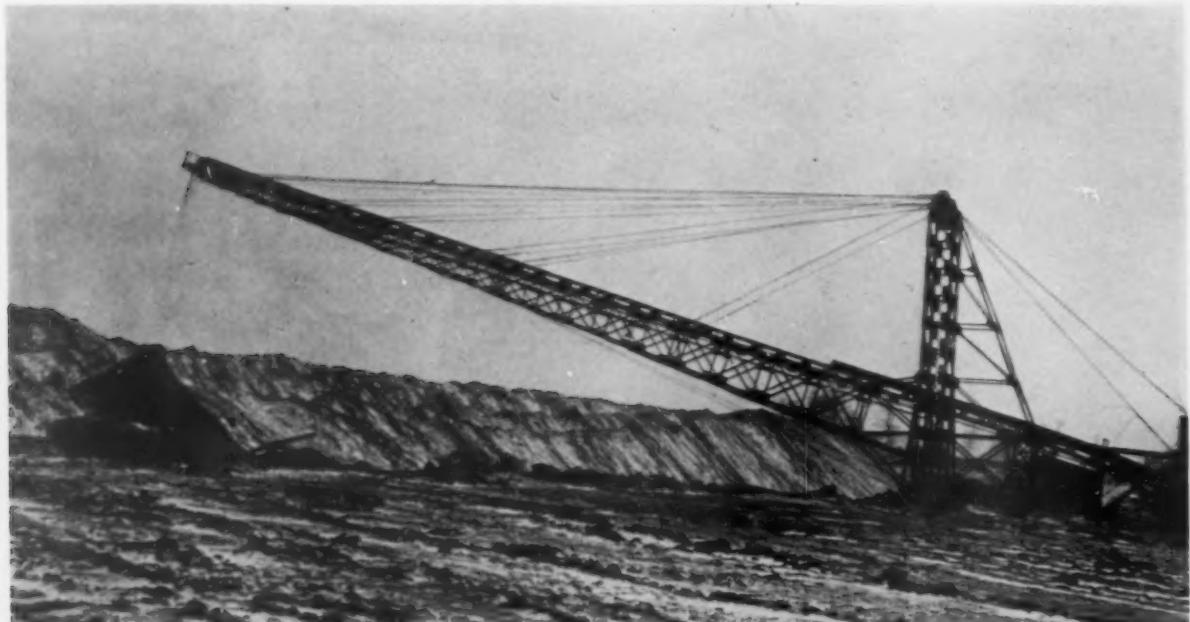
This operator uses a No. 300 Marion steam rig with a 5-cu. yd. bucket that cuts a swath 100 ft. wide using a 95-ft. boom and deposits the debris in the worked out portion of the quarry. They also have a 9W Bucyrus-Erie electric dragline with an 8-cu. yd. bucket. This newer piece

of stripping equipment has a 200-ft. boom. Both Page and Bucyrus-Erie buckets are used. The dragline is used on the heavier overburden. This rig works from the top of the bank and casts its load across the top of the stripped area.

The other two operators use stack-

ers of the Greenville type. One of these machines has been in service since 1929. This stacker has an overall length of 220 ft., uses a 36-in. belt and handles 400 tons of overburden per hour. It is loaded by a 40-A Diesel Marion shovel. The sec-

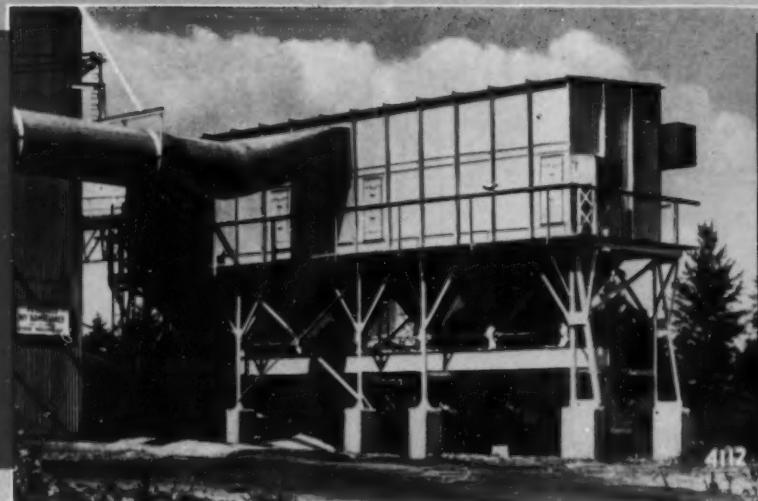
(Continued on page 58)



Another piece of equipment used in stripping operations in the Hillsville area is the stacker which is 220 ft. long and handles 400 tons of overburden an hour

• An Aid to Greater Production

SLY DUST CONTROL



Sly Dust Control at the Stato Milling Co., Peshtigo, Wis., producers of granulated roofing stone.

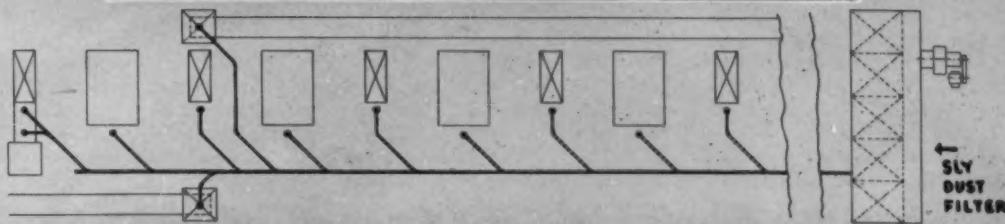


Diagram of connection of Sly Dust Filter with various sources of dust—crushers, screens, conveyors and elevators. At these points dust-laden air enters hoods and is drawn through piping to the filter—dust filtered out and easily disposed of.

IN these days of high-speed production, Sly Dust Filters are of vital aid in making cleaner plants, helping maintain quality of product, saving maintenance costs, and protecting health and safety of employees.

Briefly, Sly Dust Filters offer you:

- (1) Greater filtering capacity because of more filtering cloth
- (2) Taut bags (patented) save power and improve dust removal
- (3) Bags more easily replaced
- (4) Automatic control (any degree) minimizes or entirely removes the human factor
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Whatever your dust problem, write us. Sly engineers are experienced with all kinds of industrial dusts. We shall be glad to tell you what advantages you, too, can realize, and give you full particulars.

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That the advantages of Sly Dust Filters—their savings in space, power, and maintenance—are widely appreciated in the Cement Industry is evident from the fact that Sly is a 4 to 1 favorite in this industry.



DRILLING-BLASTING

Blasting A 22 ft. Ledge Over A Wide Area

Wagon drills used to drill blast holes for limestone, and horizontal augur type drill employed to bring down overburden

THE HILLSVILLE limestone deposit is one continuous bed of stone, practically horizontal with some slight rolls in it here and there. At one operation a small vein of coal is being mined. The coal seam is in the overburden.

The four larger producers all co-join in their holdings. The bed averages about 22-ft. thick and is underlaid with shales.

Drilling of this relatively thin bed of limestone has become more or less identical at all the quarries, and they have standardized on wagon drills with Cleveland and Ingersoll-Rand

Close-up of drilling operations. Salamander and shelter for workmen, to the left

types seemingly the favorite. The wagon drill will drill 400 to 500 feet per day of 8 hours using three changes of steel per hole (8, 16, and 24-ft. steel). Forged steel bits are favored. The holes are drilled to receive 2-in. diameter, 60% powder. These sticks are 8-in. long and there are about 40 sticks to a 50-lb. box.

When a quarry surface has been stripped to a width of about 85 ft. between the toe of the cast strippings and the face of the overburden, vertical holes are put down to the shale below (22-ft.) with the holes spaced 7-ft. by 7-ft. 6-in. Around 130 holes are loaded and shot at one time. A typical dynamite load in each hole



Wagon drills are used almost exclusively for drilling blast holes. Note fire to keep air lines from freezing. Quarry car train may be seen to the left

DRILLING—BLASTING

is to have 10 to 12 sticks in the bottom, 9 to 10 in the middle, and 2 to 3 near the top (2-ft. from top of hole). Dirt is used for stemming. Three primers are used to each hole, and the holes are shot with batteries. American Cyanamid, Hercules and Dupont, 60% gelatine was observed in two of the quarries. Some blockholing and mud capping is practiced as the stone tends to break in large but thin slabs.

Haulage

HERE are two broad classes into which the Hillsboro fluxstone operations fit. One class is where the shovel and transportation are at the same elevation. Three of the quarries use this system. The second classification is where the shovel works at a lower elevation with the transportation system being on what would normally be the top of the quarry. One operator uses this system and in doing so his shovel dipper stick and boom have to be considerably longer



One of the steel company quarries in the Hillsboro district uses 15-ton motor trucks to haul rock to the crusher



Above: Horizontal drill for drilling blast holes to bring down siliceous limestone overburden. Below: Close-up of auger type drill used in horizontal drilling

than for work in the first classification.

These shovels lift to a height of 27 ft. and work in front of a breast 22 ft. high and about 90 ft. across. Two moves per day are about average. Marion and Bucyrus-Erie buckets of 5 cu. yd. capacity are used.

For loading, steam shovels predominate in numbers over the electric or Diesel types but one of the larger commercial operators who now loads all stone with two No. 252 Marions rebuilt for this purpose is making efforts through the priority board to purchase a new 170B Bucyrus-Erie. He has found that his steam shovels through many years of hard usage have gotten to the point that he must get modern equipment to get out stone, and in making the effort to get a new shovel stresses the point that it is not a matter of economics but of necessity. It will have a longer boom and dipper stick than the standard machine and will have either a 4½-cu. yd. or 5-cu. yd. bucket; whatever he can get. It will be electric and have double sticks. His present steam shovels have 5- and 3½-cu. yd. buckets with single sticks.

Another commercial operator uses

(Continued on page 58)

CRUSHING

Agricultural Limestone By-Product

FOR PRIMARY CRUSHING, the gyratory type is by far the most popular in all of the Hillsboro district plants. The 21 and 24 gyratories are the sizes used. Most of the rock cars dump direct to the crushers but one operator has a heavy grizzly (5-in. space) ahead of the crusher. This results in a reduction of the amount of minus 1½-in. material which is the bane of all the operators in the field as it amounts to about 35% of their production. The grizzly also increases the capacity of the crusher and takes some of the wear due to impact of cascading stone.

To scalp out the fluxing stone both vibrating and rotary screens are used. One commercial producer uses a double-decked Niagara vibrating screen for this purpose, a second commercial producer uses two 3-deck 4- x 12-ft., low-head, Allis-Chalmers vibrating screens. A third producer uses two 5- x 21-ft. Allis-Chalmers rotary screens. The primary purpose of all these screens is to remove the fines that have no part in the steel industry, and to produce the desired furnace rock and screen out oversize for secondary reduction. All operate dry.

The treatment of stone varies at each plant, depending on what use is put to the finer sizes and whether or not the operation produces commercial aggregate. Thus one producer sells his screening "as is" to another company that turns it into agricultural limestone, and the total screening consists of the two double-jacketed rotary screens that produce fines and flux stone. These fall to bins.

At the operations where fines are used for cement rock the plant is so designed that it can produce flux stone, commercial aggregate, or cement rock either simultaneously, or if desired, all the larger sizes (flux stone) can be crushed for commercial stone. Similarly, if desired, the entire plant output can be reduced to minus ¾-in. for cement rock. This plant also produces stone sand.

At this operation furnace stone or oversize can go through a 50-60 Dixie hammer mill, but finer stone (not over 2½-in.) can go through a 4-ft. Symons cone crusher. Large oversize unfit for flux because of its size is sent to a No. 8 Allis-Chalmers

gyratory reduction crusher from which the material is elevated by bucket elevator and returned to the primary screening circuit. In the plant there also is provided a 42-in. sorting belt so that any undesirable stone and clay balls can be removed before passing the stone to the flux stone loading bins.

Produce Stone Sand

Stone sand is prepared by two sand screw-type classifiers. The fines from the final washing screen flow to this device which has screws about 16-in. in diameter and close to 20-ft. long, and rotate at a sufficient r.p.m. to give the desired settling rates in the pond end of the classifier.

At the plant where the Niagara scalper is used the larger sizes then pass to two 5- x 20-ft. Allis-Chalmers rotary screens that are double-jacketed. Oversize too large for flux stone is reduced in a 16-in. Traylor Bulldog gyratory crusher. When the plant was first built some 25 years ago, the secondary gyratory crusher installed at that time received so much tramp iron in the subsequent years that the crusher was finally rendered unfit for use. When the newer crusher was purchased, a short conveyor belt was installed to feed it, and a Stearns magnetic head pulley was provided so that no tramp iron will bother them in the

future. The conveyor is driven through a right angled Cleveland gear reduction unit and a 5-hp. Wagner electric motor. The Bulldog crusher is driven by a 75-hp. G.E. motor.

Where commercial aggregates are produced, such materials are scrubbed and washed but, during the winter months, only one plant continues to wash. Practice seems to be to stockpile these smaller sizes and reclaim them later when more favorable weather increases construction demands. One plant washes the stone for grinding for agricultural limestone but pre-dries it in rotary driers before pulverizing.

Stockpiling

ONE of the outstanding features in the Hillsboro district is the huge size of the stockpiles that accumulate over the winter months. A typical pile is that of one of the commercial producers where the fines are stockpiled with two locomotive cranes. When the pile is too high for the cranes, truck roads are built up the sides of the piles and the stockpiling continued with trucks. This pile was so high that two switchbacks were noted in the road leading to the top of the pile. The locomotive cranes unload standard 16-cu. yd. cars that are switched with 40-ton steam locomotives. About 1000 tons of stone are piled here every day during the winter months but during periods other than winter time this material finds an outlet without stocking.

Water in Quarries

All the quarries in the district have considerable water and it seems to be the practice to pump this water to worked out portions of the quarry where it is boosted over the rim of the pit. This rehandling of water requires considerable pumping. One typical operation had six pumps, all electric driven centrifugals. They had one 8-in. and one 10-in. Worthington, two 6-in. Demings, and three 4-in. Swabe pumps for the quarry.

Pumping and handling of water during the winter is naturally one of the most troublesome features of winter operation, but by keeping the pumps in continuous operation or blowing the lines and draining the pump itself, the water is kept under control. The greatest volume of water is in the early spring when the thaws start at which time all pumps are working to capacity.



Large number of gyratories are used in the crushing plants of Hillsboro quarry district

America's Embattled Farmers

Need Finer Ground Limestone,
Lime or Hydrate for Best Crop
Results This Year . . .

Sturtevant Air Separators and Ring Roll Mills are Built to Meet Today's Agricultural Demands.



STURTEVANT offers you proven-efficient pulverizing and fine air separation equipment, precisely adapted to producing the finer ground limestone, lime and hydrate needed by farmers for quickly increasing the productivity of their soil this year.

Over a period of many years, in plants throughout the world, Sturtevant Ring Roll Mills and Air Separators have proven themselves by increasing output with their large capacity and dependable operation. They are the ideal combination in a closed circuit system for producing finely ground materials.

Sturtevant Ring Roll Mills provide a range of reduction from 10 to 200 mesh, equally efficient on hard or soft materials.

Sturtevant Air Separators include such engineering features as (1) Range of fineness from 40 to 350 mesh, (2) Capacities of $\frac{1}{4}$ ton to 50 t.p.h., while increasing mill capacity as much as 300%, (3) Controlled specific surface area, (4) Lowered mill and product temperatures.

Investigate today how Sturtevant grinding and separation equipment can help you meet strict specifications for finer ground materials.

- Air Separators
- Ring Roll Mills
- Jaw Crushers
- Crushing Rolls
- Swing Sledge Mills
- Moto-Vibro Screens
- Rotary Fine Crushers

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STOCK PILING

A novel feature at this same operation is the installation of Scaife water softeners. They have three of these softeners which can handle 100,000 gal. of water per day reducing the hardness down to one grain of hardness. As the plant uses steam shovels and steam locomotives, the reduction in hardness of the water for the boilers requires that they now only have to blow out their boilers once per year. The softeners use about 25 lb. lime, 20 lb. sodium carbonate and 3 to 4 lb. of aluminum sulphate per 15,000 gal. of water. The latter chemical acts as a coagulant after which the water is filtered through sand beds. Domestic water is chlorinated and filtered through more sand than the plant water.

Stripping

(Continued from page 52)

ond stacker is about the same size but has only been in operation a few years.

There has been no special difficulties in the stripping operations due to winter conditions except that repairs are done under more difficult conditions and that incidental to round-the-clock operations on some of the stripping work. One of the above stackers works Sundays and on a 24-hr. basis.

No effort is made at any of the operations to level off or try to reclaim any of the land for agricultural purposes once the limestone has been removed. If one sees the gold dredges in California that stack their tailings in such a manner that the soil is put back on top of the coarser debris in an even and level manner, thus reclaiming for future use many thousands of acres of land, he can but wonder if it would not be practical and economical to do likewise with the great areas of strip piles in the Hillsboro area.

In all of the quarries some secondary clean-up must be made after the greater portion of the overburden has been removed as previously described. One operator uses a 2½-cu. yd. Lorain shovel for this purpose. A second uses a Caterpillar and dozer which pushes the muck back where the shovel can load it on the stacker. Some make a final surface clean-up with hand shovels to insure low silica in the shipments.

One difficulty with winter stripping is due to the frozen ground standing up vertically with apparently no indications of caving, but when a warm

day comes, this bank thaws and has sluffed off enough debris to bury the tracks for a considerable distance.

Haulage

(Continued from page 55)

a 4161 Marion electric shovel with a 5-cu. yd. bucket. The remaining two operators use a 4-cu. yd. 103C Bucyrus-Erie steam shovel and two 5-cu. yd. electrics.

One operator uses Euclid "Trac-Trucks" for hauling stone. These handle a pay load of about 16 tons and are end dump. Another uses Diesel electric haulage pulling as high as eighteen 10-ton cars to a train. The two independent operators both use steam locomotives. One uses 25-ton Western side-dump cars that are pulled in trains of 3 and 4 cars with a Heisler steam locomotive. The other uses cars that are made in their own shops. These are 10-ton side dumpers and are hauled in trains of ten by 28- and 30-ton Porter locomotives. Grades of 2 to 3% are easily handled.

The cars at this latter operation resemble Easton type but are made of white oak, heavily reinforced with iron and are 38-in. gauge. They are equipped with Timken roller bearings. The owners have found that wood bodies are better than steel.

During winter operations and due to wet muck, ice tends to build up in the bottom of cars so bleeder holes are provided in the bottom of the cars and live steam is used when necessary to melt out the accumulations of ice. Rock salt is used at switch points to keep the ice from building up, water lines to the shovels are buried, and steam locomotives are blown out with compressed air when not in use.

At the operations where trucks are used, quarry scales are used for checking up on the tonnage hauled. One independent producer uses a set of Toledo, automatic track scales that record the weight and train number of each lot.

Quarry Busy on Navy Order

DAVIS QUARRY, Blue Springs, Nebr., which was leased by the Davis Brothers to B. L. Anderson, Cedar Rapids, Iowa, has been completely re-equipped and is now turning out crushed rock to fill a government order for 125,000 tons to be used in constructing a Naval Depot. Capacity of the quarry is about 1500 tons a day.

Liming Essential

(Continued from page 44)

factors that need to be emphasized, especially during the emergency. It is generally recognized that the finer the ground limestone, the sooner it reacts with the soil and becomes effective in increasing crop yields. This is well brought out in Fig. 1. The material finer than 60-mesh became entirely available during a period of six months. Material coarser than this, however, became much more slowly available. This is particularly true of the particles held on the 20-mesh sieve.

In a recent study of the fineness of a number of ground limestones sold in Iowa, it was found that over half the samples contained more than 10 percent of particles that did not pass an 8-mesh sieve. The average amount held on an 8-mesh sieve for this group was 22 percent, and the amount passing a 60-mesh sieve averaged 31 percent. On the basis of the data in Fig. 1, it is evident that only about 48 percent of these ground limestones would become effective in the soil during the first six months after application, and only 56 percent during a period of two years.

It is of course recognized that the cost of producing ground limestone increases with increases in fineness and that there is a point beyond which it would not be economical to increase the fineness of grinding. On the other hand, it must be admitted that it costs just as much to handle, transport and spread coarse, only slowly available, material as it does fine material or dust.

Conclusions

1. The use of ground limestone in Iowa should be increased immediately as a means of meeting our feed and food production goals.

2. At least 1½ million tons of ground limestone should be used annually.

3. Provisions should be made by the government agencies concerned to make possible the production and distribution of at least this amount of agricultural limestone annually.

4. Larger payments should be made in the A.A.A. program for the use of lime on acid soils.

5. Limestone in Iowa should be ground to a greater degree of fineness in order to obtain as quick results as possible from the tonnage used, and in order to effect economies in labor, and transportation costs.

Here it is! A PULVERIZER DESIGNED EXPRESSLY FOR THE AGSTONE INDUSTRY

TYPE "B" JUNIOR HERCULES MILL

It's the first pulverizer that has even been developed expressly for the agricultural limestone industry.

The mill has had a thorough trial, having been in regular operation (16 to 24 hours daily) in the plant of a large producer of Agricultural limestone taking a feed $\frac{3}{4}$ " to 1" and making a product, 100% passing a 20 mesh sieve at the rate of 8 tons per hour. A coarser product can easily be secured with relatively greater capacity. A single unit producing a uniform finished product in one operation.

UNBELIEVABLY LOW MAINTENANCE AND POWER COST

We specialize in designing complete pulverizing plants. Why not write for a catalog or let us send one of our capable engineers to help you. We offer the best in equipment and service.

Only Bradley could engineer and design a mill of this kind as Bradley has had more experience in this field than other manufacturers.

This new addition to the famous Bradley line of pulverizers is the pride of our organization which has been making grinding and pulverizing machinery since 1894.



BRADLEY PULVERIZER COMPANY

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American Crushers

Are Profitably Meeting the Tremendous Demand for Agricultural Limestone

All over the country there is a greatly increased demand for agricultural limestone to help farmers increase crop yields and pasturage.

Ag-stone producers are meeting the demand with economical, dependable American Hammer Mills.

These ruggedly built crushers, long known for their low cost, are capable of turning out top tonnages of specified fineness.



View of Willingham-Little Stone Co., Whitestown, Ga. One of the state's largest producers of agricultural limestone, using two American Hammer Mills.

SIMPLICITY—in design and operation—assures continuity of service.

STURDINESS—in construction—extra heavy construction, built to withstand the most severe service.

EXCEPTIONAL—operation characteristics—anti-friction bearings. Patented adjustable Grinding Plant, metal trap, manganese grinding parts and the original American Hammer design.

Let us show you how an AMERICAN Crusher will help you to produce agricultural limestone economically and dependably.

AMERICAN PULVERIZER COMPANY

1245 MACKLIND AVENUE

ST. LOUIS, MO.

Fifteen Million Tons of Limestone Needed to Sweeten Wisconsin Soils

By C. J. CHAPMAN

Soils Department, University of Wisconsin

YES, IT'S TRUE that 6,617,000 tons of agricultural liming materials have been applied to Wisconsin farmlands since August 1, 1934. That's a lot, thanks to the splendid work of county agricultural agents, our Agricultural Extension Service, and the cooperation of New Deal action agencies. This vast tonnage actually represents more than three times the amount used by Wisconsin farmers in all history prior to the setting up of our Wisconsin limestone production projects in cooperation with the F.E.R.A. and W.P.A. relief agencies in August, 1934.

But soil tests on some 252,000 soil samples indicate that 65 percent of Wisconsin farmlands are still acid and in need of lime; in fact, we estimate there are still a good 6,000,000 acres of acid soil in Wisconsin. At an average rate of 2½ tons per acre it would take an additional 15,000,000 tons of limestone to finish the job of liming all acid soils in this State. But even if and when Wisconsin farmers have completed the job of liming every acre of acid soil, they should start right over again and re-lime their land. True, the initial application of say 3 tons per acre will

last for 6 or 10 years, but at the end of that period farmers should give their fields an additional 1½ tons per acre and should repeat this treatment every 6 to 8 years.

But our liming program during the last eight years has borne fruit. We have more than doubled our acreage of alfalfa during this period; in fact, for the past four years Wisconsin farmers have harvested better than 1,000,000 acres of alfalfa per year. This represents twice the acreage that was being grown on Wisconsin farms in 1934. We know, too, that the yields of clover have been greatly increased. The production of all other farm crops has been improved due to the benefits of lime, direct or indirect.

Shortage Expected This Year

Last year was our big year in agricultural limestone production. Figures just compiled show that a total of 1,398,000 tons of liming materials was produced and applied to Wisconsin farmland. Most of this was supplied in the form of pulverized limestone, although some marl, paper mill sludge, and carbide refuse were used.

I am afraid, however, that in 1943



C. J. Chapman

due to labor shortages, competition for trucks, and rail transportation restrictions the actual production and delivery of liming materials will be considerably less than for 1942. And this is a regrettable fact because the liming of our acid soils is the backbone and foundation of a soil-building program and is essential to continued high level production in this critical period.

But the liming of our soils is only half the story of soil fertility maintenance. Soil tests on these 252,000 samples show that our Wisconsin soils are running low on both phosphates and potash; in fact, 76 percent of these soils were deficient in available phosphorus; 54 percent low in available potash. It is true the tonnage of commercial fertilizer used by our farmers is increasing rapidly.

(Continued on page 72)



Using a seeder type spreader to distribute ground limestone

Lime May Be Spread with Manure

Vermont Agricultural Experiment Station
Finds Advantages in Dual Use of Spreaders

SPREADING MANURE with lime, saves labor and time." This might well be a slogan for many dairymen, especially those farmers whose only equipment, for spreading lime, is an ordinary shovel or manure spreader. It is quite difficult, if not impossible, to get even distribution of lime on the field without proper equipment and too few dairymen have lime spreaders. Bulk handling of lime in which large trucks deliver and spread it on the farm are proving very satisfactory, but here again, lack of equipment and inability to deliver at the proper time, greatly hampers this operation on many farms. While it may be highly desirable to move bulk lime directly from producer to consumer—from pulverizer to the soil, yet poor roads, bad weather and condition of land at time of spreading, often make it difficult to use such heavy equipment. The purpose of this article is to propose another method which should be useful to many dairymen—spreading lime via the manure spreader.

Method Using Ground Limestone

Ground limestone has no particular beneficial or detrimental effect on manure because the latter soon ammonifies and becomes basic in reaction; in fact, as basic as is limestone itself. In this alkaline material, the solubility and activity of limestone is reduced so that it can have very little effect in driving off the ammonia. Furthermore, during spreading, it becomes intimately mixed with only a small portion of the manure.

Thus, limestone can be added on top of the loaded manure spreader, or if windy, it might be placed on the bottom, and thus both spread at one time. The amount of limestone to be used in this way will depend upon the lime needs of the soil. If ten loads of manure are spread per acre and each contains 100 lbs. of limestone, the land will receive 1,000 lbs. of lime per acre. Evidence indicates that 200 lbs. or more of limestone per load of manure may be used in this way with no appreciable effect on the nitrogen content of the manure. This latter rate would be equivalent to one ton of limestone

per acre which should be ample to supply the lime needs of the land until it is manured again. Most dairy farms apply 15 rather than 10 tons of manure per acre, which would add even greater amounts of lime by this method.

Superphosphate is being used in the stable gutter with very good suc-

By A. R. MIDGLEY
Research Agronomist



A. R. Midgley

cess on many dairy farms. Evidence indicates that limestone may be spread with this phosphated manure, in the same manner indicated above, without a material loss of nitrogen or a reduction in the availability of the phosphate. On high phosphate fixing soils this practice may actually be advantageous in maintaining phosphate availability, due to the extra protecting effect of the lime. While, no doubt, much of the phosphorus reverts to the tricalcium form, it is readily available in actively decomposable organic matter like manure. Furthermore, such a reaction reduces the formation of less desirable iron and aluminum phosphates in acid soils.

The effect of spreading limestone with manure, on nitrogen, phosphorus, and potash run-off losses, is being studied by the Vermont Station. It is important to obtain this information, especially in northern New England where the land is rolling and the surface soil frozen during the winter and early spring. Considerable run-off losses of nitrogen, phosphorus and potash often result when manure, and particularly phosphated manure, is hauled out on top of a heavy blanket of snow. This is especially true during a rapid spring thaw accompanied by rain while the surface soil is still frozen and impervious. Preliminary results show that 100 lbs. of limestone applied to manure at time of spreading greatly reduces both phosphate and potash run-off losses, especially phosphated manure. This seems to be due to the fact that lime reduces the solubility of phosphate and potash. In the latter case, lime seems to drive potash into, rather than out of, the base exchange complex of the manure, thus decreasing its solubility and run-off. This saving alone may often justify the use of limestone with manure at time of spreading.

During the present emergency, there is a concerted effort to supply limestone in bulk form. This saves labor, bagging material and thus reduces cost. While bulk limestone can be used to good advantage with manure, it is necessary to have it conveniently located near the barn or manure pile. Such a practice allows the manufacturer to grind and deliver limestone any time during the season. It distributes his peak load over a longer period and insures the farmer of having the material on hand whenever he needs it. Where manure is spread daily during the winter, it is necessary to keep the limestone dry so that it will not freeze, but bulk limestone may be stored outside.

Method Using Burned and Hydrated Limes

Caustic limes, including the burned and hydrated forms, are much more alkaline than limestone; therefore, they must be used in a different fash-

ion with manure. It has long been known that these liming materials will drive off ammonia if it is already present in manure, but recently it has been found that they also have the capacity to prevent or retard ammonia formation when added to fresh manure. Thus, these very alkaline limes may be used in the cleaned gutter of the dairy barn with a slight saving of nitrogen. This is because the high basicity of such limes tends to sterilize and temporarily retard ammonification of urine in the manure. Without this basic lime, manure readily ammonifies and then the volatile ammonical nitrogen is lost into the air by warm drying winds after manure is spread in the fields.

When these basic limes are used in the cleaned gutter, a distinct odor of ammonia is often noted when the manure is shoveled into the carrier. This is because at this moment the limed bottom portion becomes partly mixed with the partly ammonified upper portion, resulting in immediate release of some ammonia. However, in spite of this small immediate loss, more nitrogen is saved than is lost because untreated manure ammonifies much more readily, therefore more volatile nitrogen is present to be lost after spreading.

Burned and hydrated limes are usually very dusty and cause much irritation both to man and beast when they are applied to the land by the ordinary lime spreader. By using these limes in the stable gutter, this hazard is reduced to a minimum. Caustic lime, especially the oxide, has a high urine or water-holding capacity which is due to a chemical reaction (hydration) and to the absorbing capacity of the very fine lime particles. This drying effect slightly reduces the amount of bedding needed. Furthermore, manure treated

with caustic lime does not dry out as completely as untreated manure, which may help account for its nitrogen holding capacity when manure is allowed to dry out naturally in the field before covering with soil.

Farmers who wish to aid the war effort more effectively need look no farther than their own farms. Each can do his bit by using more lime. The slogan for limestone might well be, "Don't put it off, put it on the manure spreader." Where caustic or hydrated limes are available for agricultural purposes it might well be, "Don't put it off, put it in the stable gutter."

The practice of using superphosphate in the cow stable is usually so necessary and gives such good results that it is doubtful if farmers should try and substitute lime for this purpose. For use in the gutter, superphosphate should have priority over lime. However, where these basic limes are extensively used for agricultural purposes, farmers may use them in the stable gutter part of the year and superphosphate the remainder. In this way an individual field may be limed or phosphated as desired. However, both should not be used in the same gutter at the same time.

A.A.A.'s Attitude Toward Agricultural Limestone Needs

By DONALD W. AITKEN

Division of Special Programs, Agricultural Adjustment Agency

THREE IS NO SUCH THING as "A.A.A. Limestone." The agstone that is distributed to farmers under that name is the product which the limestone industry has been selling to farmers for decades. The three A's which have become associated with so much of the lime that is going into American soils have no mysterious connotation. They are merely indicative of the recognition given by the Department of Agriculture to the importance of that material in our farm production. A.A.A. has provided a means of getting more limestone produced and more farmers to use it.

What of the past of this active interest in limestone by the Department of Agriculture? It developed out of a need created by the first agri-

culture conservation programs. The A.A.A. planned to stimulate the production of soil-conserving crops by offering cash inducements to farmers who made the liming of their soil a part of their cropping plans. Results could only be measured by the volume of limestone moved—and at first it lagged. There was the desire to participate, but there was not everywhere the quantity available or the cash to advance. Thus was suggested the need for A.A.A. stimulation of agstone production as well as use.

A.A.A. decided early to concentrate on the material rather than the package. Probably more than 75 percent of all limestone moved under A.A.A. supervision has been in bulk. Where local preference determined that volume development would depend upon making bagged material available, the sacrifice was considered warranted. Even here, however, encouragement has been given to a change to bulk delivery. Considerable headway has also been made in developing spread-on-field service.

Part of O.P.A. and W.P.B.

Much credit for sustaining limestone production during the past year at the high level reached through A.A.A. assistance goes to the Washington offices of O.P.A. and W.P.B. Both of these war agencies have shown an intelligent understanding of the problems of the limestone industry. O.P.A. pricing policy has brought about the movement of the

(Continued on page 71)



An effective way of distributing lime is to use a manure spreader

Sour Soils and Liming

By J. W. WHITE

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KNOWLEDGE OF THE VALUE of lime for soil improvement was brought to America by early colonists. In the year 1637 a member of the Massachusetts Colony wrote to a friend in England as follows: "I do believe, that if we had marl, lime, or other manures, this barrenness might in part be cured, but as yet, we are destitute of these supplies." A letter written in 1645 from New Amsterdam read in part as follows: "There are some buildings built of stone; they make the lime from oyster shells of which there are great heaps made in former times by the savages who partly live by that fishery." (*The Beginning of Agriculture in America* by Lyman Carrier.)

In one of his papers on "Chemistry of Old Boston," Lyman C. Newell, Professor of Chemistry, Boston University, wrote as follows: "The colonists were familiar with the English method of manufacturing lime by heating limestone, and doubtless they prospected for limestone as they did for gold, lead, medical plants, etc. Hence, there was great rejoicing and considerable excitement when limestone was discovered in 1697 in Newbury, Mass., by Ensign James Noyes. The news of the discovery spread, and it is said that at first thirty teams a day came to Newbury to drag away the precious 'stone.' The few inhabitants were startled by the removal of their riches, and sent James Brown, the deputy sheriff, to stop the spoilage."

According to Dr. Newell, long before the Revolution, lime was manufactured in large quantities in and near Boston. Lime, he states, was manufactured from limestone as early as 1661 in Providence, R. I., and sent in large quantities to Boston. This date, no doubt (282 years ago), marks the beginning of commercial lime production in America.

Discovery of Limestone in Pennsylvania

The absence of limestone along the Atlantic Coast worked hardships on the colonists as it was needed as a source of lime both for agriculture

and commerce. The beds and heaps of oyster shells left by the Indians, together with marl, served as a fair substitute in part for the yet undiscovered limestone deposits which lay in abundance somewhat to the west of the early colonial settlements. In 1754, William Logan, whose farm was near Philadelphia, records putting 50 bushels of stone lime in small heaps to an acre. It is of historical interest to note that the burned lime mentioned by William Logan was made from limestone quarried near Mt. Joy, Lancaster County, and so far as the writer has been able to determine, represents the first limestone quarried in this state. Thus does 1754 (189 years ago) mark the beginning of the use of the inexhaustible supply of limestone resources of the Keystone state.

In 1810, Richard Peters, then President of the Philadelphia Society for Promoting Agriculture (organized in 1785), gave what may be considered the first comprehensive address on liming land. He was owner of the famous Belmont Farms, now Fairmont Park, Philadelphia, where his mansion, now a museum, is one of the show places of the extensive park area. The following quotations from his historical speech are of interest: "We have not a solitary communication upon the practice of liming land though carried to a very great extent in our state. In no country is lime in more abundance; nor can it be of better quality. When I began to lime 45 years ago (1765), I had no practical instructor for it was a novelty in my neighborhood (Belmont Farms). Lime is annually becoming dearer to the farmers in old settlements and especially in the vicinity of the city and larger towns; owing to the demand of this material for building and the scarcity of wood for fuel. I have had kilns of lime burnt on my Belmont farm (which is on the tide water of the Schuylkill) from limestone brought down the river, through the great falls, in a boat carrying 12 to 14 tons. Enterprising persons might establish on a large scale some plan of this kind. Since



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this communication, I am informed that a plan for burning lime on the tide water of the Schuylkill is commenced. It has my sincere wishes for its success."

The limestone brought down the Schuylkill over 130 years ago probably was quarried from near Cedar Hollow, the site of the present Warner Co. operations in Chester County. This transportation of limestone mentioned by Richard Peters in 1810 probably marks the beginning of our modern lime industry now so highly developed in this section.

Following this period of colonial expansion westward, many kilns were put into operation throughout the limestone valleys of the state. Thus did the farmers of southeastern Pennsylvania pave the way for the systematic use of lime in America, and the supremacy of this great agricultural section is due in large measure to their program of lime, manure, and legumes. I can offer no greater tribute to lime than this: For over two centuries it has been a major factor in the development and maintenance of a permanent agriculture in southeastern Pennsylvania unequalled anywhere in America; and the "Garden spot" extends far beyond the boundaries of Lancaster County. Today, 189 years since lime was first made in Pennsylvania from burning limestone, this section almost exclusively uses the more concentrated forms of agricultural lime for soil improvement.

The properties of acid soils have been the subject of careful study for

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a number of years. As the result of these investigations, many conflicting theories have been advanced due to the fact that this undesirable soil condition is a complex one involving many factors which tend to arrest the normal functions of the soil. The presence of toxic substances, both organic and inorganic, the absence of basic lime, and decreased availability of essential plant food constituents, no doubt, all play a part in bringing about conditions unfavorable to the best development of the chemical, physical, and biological properties of the soil. It has been shown conclusively that when some form of basic lime is applied in sufficient quantities to these sour or acid soils the undesirable properties disappear and the soil again will become productive under proper management. The question of economic importance, therefore, is one involving the quantitative application of lime in whatever form it may be used.

The properties of soils of varied acidity are illustrated by the data included in Table 1. A limestone soil of pH 7.3 was divided into ten equal parts and each portion was treated with varied amounts of sulfur. The ten portions of sulfur-treated soils and an equal portion of the original soil were arranged in a series of small field plots separated by boards one foot in width. The soils were left undisturbed for a period of two years. The soils were then air dried, screened, and subjected to laboratory study. From the ten lots of soils, six were selected on the basis of pH range shown in Table 1. Determinations

were made on the rates of nitrification, organic matter decay, and the number of bacterial per gram of each of the six soils. In another experiment hydrated lime was applied to the four acid soils in amounts sufficient to correct most of the acidity, and the same studies were repeated. The data secured are shown in Table 1.

The number of bacteria varied from 85.3 to 2.7 million per gram of soil. The rate of nitrification and organic matter decomposition serve to illustrate the fact that an acid soil is a sick soil incapable of normal activity. The addition of nitrogen and a complete fertilizer to the soils treated with cellulose failed to restore the acid soils to normal activity. Compared with soil No. 1, pH 7.3, the addition of lime completely restored the cellulose decomposing power of the acid soils and greatly stimulated bacterial numbers.

Pennsylvania Lime Experiments

When pulverized limestone became a competitor on the agricultural lime market, a period of keen competition was created which led to exaggerated claims by the respective producers concerning the merits of their products. As a result of this period, which the writer has termed an era of lime "impropaganda," there arose considerable confusion in the mind of the farmer concerning the relative values of limestone and the concentrated lime products. The county agents of our Eastern States had at hand little definite information from our experiment stations on the sub-

ject and were unable to make a definite stand.

In realization of this unfortunate situation the writer began in 1912 a series of experiments planned to make possible a detailed study touching on the many mooted questions pertaining to the relative merits of the various forms of lime. From 1912 to 1916 these experiments were in the nature of laboratory and greenhouse studies designed to produce preliminary results for more or less immediate use. In 1916 the first series of more comprehensive field plot studies was begun on DeKalb, Volusia and Westmoreland soils. At the same time a detailed lime requirement survey of Pennsylvania soils was carried out which resulted in securing definite information concerning the relative needs of the various soils for lime.

The various lime experiments involved the following studies: (1) Relative value of limestone of varied degrees of fineness; (2) Relative value of pulverized limestone, hydrated lime, ground burnt lime, marl, precipitated lime carbonates from industrial plants, and several forms of blast furnace slag; (3) Different rates and frequency of lime applications; (4) Effect of lime on the microbiological activity of the soil; (5) The relative needs of various grain and forage crops for lime; (6) The comparative effects of burnt lime and pulverized limestone on the organic matter of the soil; (7) The influence of lime on nitrogen fixation of the soil microorganisms.

The results of these various funda-

TABLE 1.—CONTROLLING INFLUENCE OF SOIL ACIDITY ON THE MICROBIOLOGICAL ACTIVITY OF THE SOIL, INCLUDING BACTERIAL NUMBERS, AND RATES OF NITRIFICATION AND ORGANIC MATTER DECOMPOSITION

Soil No.	pH	Number of bacteria per gram of soil	Rate of nitrification	Relative microbiological activity based on soil No. 1 taken as 100				Lime applied to soils Nos. 3, 4, 5, 6	
				Organic matter decay				pH	Number of bacteria per gram of soil
				Soil alone	Soil + cellulose	Soil + cellulose + N	Soil + cellulose + NPK		
MILLIONS									
1	7.3	85.3	100	100	100	100	100	7.3	81.6
2	7.0	72.1	81	79	80	91	97	7.0	73.7
3	6.4	66.4	72	76	67	91	96	7.2	68.0
4	5.2	38.1	31	53	51	76	63	6.8	68.1
5	4.4	15.1	7	34	61	43	62	6.7	63.6
6	3.9	2.7	10	35	38	39	50	6.3	116.0

TABLE 2.—RELATIVE VALUE OF CROPS PRODUCED BY COMMERCIAL FERTILIZERS (N-P-K) ON LIMED AND UNLIMED LAND. DEKALB, VOLUSIA AND WESTMORELAND SOILS

Crops in Rotation	Dekalb Soil		Volusia Soil		Westmoreland Soil		Summary	
	N-P-K Limed Land	N-P-K Unlimed Land	N-P-K Limed Land	N-P-K Unlimed Land	N-P-K Limed Land	N-P-K Unlimed Land	Increased Value on Limed Land	Percent Increase
Corn	\$ 30.52	\$ 7.78	\$ 40.97	\$ 23.86	\$ 44.36	\$ 19.03	\$ 21.73	128.7
Oats	29.76	15.13	16.94	13.38	23.34	17.60	8.31	55.2
Wheat	27.63	12.00	23.80	10.50	28.17	18.96	12.71	91.7
Hay	12.90	6.56	18.60	8.83	28.13	12.90	10.45	110.8
Total	\$100.81	\$41.47	\$100.31	\$56.57	\$124.00	\$68.49	\$53.20	97.7

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TABLE 3.—PROGRESSIVE DECLINE IN VALUE OF CROPS PER ROTATION (4 ACRES) AS RESULT OF 56 YEARS' USE OF SULFATE OF AMMONIA¹ WITHOUT LIME. JORDAN SOIL FERTILITY PLOTS, 1882-1938. TIERS 1-3.
Based on average of two succeeding rotations.

Crops in Rotation ²	1882-1889	1890-1897	1898-1905	1906-1913	1914-1921	1922-1930	1931-1938
Corn	\$ 53.38	\$ 41.60	\$30.15	\$19.19	\$ 9.70	\$ 8.07	\$12.13
Oats	25.34	22.87	19.16	18.01	19.54	12.50	14.77
Wheat	29.29	28.74	21.37	15.83	5.27	1.65	3.65
Hay	23.88	22.21	11.74	10.72	5.89	3.08	1.62
Totals	\$131.89	\$115.42	\$82.42	\$63.75	\$40.49	\$25.30	\$32.17

¹72 pounds of nitrogen, 48 pounds phosphoric acid (P₂O₅) and 100 pounds of potash (K₂O) applied to corn and wheat.

²Crop value based on current market prices.

mental studies together with the data secured from the liming of two tiers of the Jordan Soil Fertility plots have furnished definite information as a basis for lime recommendations. In general the experiments led to the conclusion that the various forms of lime have similar crop producing value when applied to the soil on the basis of equal units of lime oxides of similar degrees of fineness. That frequent applications have proven more economical than one heavy application over a period of years. In the production of farm crops the farmer is advised to purchase the form of lime he can secure the cheapest per unit of available lime oxides laid down on the farm.

Results of Field Plot Experiments

A summary of the results secured on the outlying field experiments is included in Table 2. The evidence in support of the value of lime is so conclusive that little further comment seems necessary. It is sufficient to point out the fact that lime caused an increase of 97.7 percent in the effectiveness of the commercial fertilizers used.

Evidence of the Value of Lime

From 1881-1921 no lime was used on the Jordan plots which had received commercial fertilizers. In 1922 and 1923 two of the four tiers of plots were limed. It is possible, therefore, to show the progressive decline in yields of the four crops during a definite period as result of the increase in soil acidity and also the effect of

lime in overcoming the controlling influence of acidity.

The data of Table 3 show the progressive decline in yields on one of the sulfate of ammonia plots due to soil acidity during a period of 14 rotations or 56 years. The fact that on this fertile limestone soil the crop values decreased from \$131.89 to \$32.17 per rotation leaves no doubt of the folly of wasting commercial fertilizers on soils in need of lime.

The data presented in Table 4 include beyond question the most conclusive evidence ever presented on the effectiveness of lime in the process of soil rejuvenation. In this table are shown the crop values per rotation before and after liming. Let us study the data of columns 3 and 4. Note the wide difference in values of the three complete fertilizers on unlimed land measured in terms of crop values. Thus the nitrate of soda treatment has a value equivalent to \$99.65 in excess of sulfate of ammonia. After two rotations on limed land the difference is only 8 cents. In fact there is no significant difference in the values of the three sources of nitrogen after the controlling influence of acidity is removed.

I wish that every farmer in our eastern states where 75 percent of the farm lands is in need of lime could see these results and fully appreciate this significance. If so, it would go a long way in making America the world's market basket for it has been shown as the results of many years of painstaking studies

that lime has paved the way for the most economical use of manure and commercial fertilizers whatever system of agriculture is followed. Let us then as never before learn to use the land and not abuse it.

During the last few years the volume of agricultural lime used in the Keystone state has increased approximately from 400,000 to 800,000 tons per year. Let us not, however, be content with well doing for at least 2,000,000 tons could be used with profit on the 8,000,000 acres of plowed land.

The increase in the use of agricultural lime may be attributed to several causes: (1) The effective campaign of the several Federal agencies; (2) To the educational campaign of the Extension service, and (3) to the full and efficient cooperation of lime producers and sales agencies of the state.

New Highway Striping Paint

UTAH STATE HIGHWAY DEPARTMENT, Salt Lake City, has discovered "gilsonite," a synthetic product for replacing the stripe of paint down the center of the highways. The product is a lustrous type of asphalt discovered near Fort Duchesne, Utah, that is said to have long wearing properties and to have good visibility. On black asphalt highways, white granite chips will be rolled into a thickened gilsonite mixture for application.

TABLE 4.—INCREASED EFFICIENCY OF COMMERCIAL FERTILIZERS ON LIMED LAND. JORDAN SOIL FERTILITY EXPERIMENT. BASED ON THE RELATIVE VALUES OF CROPS PRODUCED PER ROTATION ON UNLIMED AND LIMED LAND—1922-1930

Plot Treatments ¹	Before Liming	pH	After Liming	Tiers 1-3 Unlimed	Tiers 2-4 Limed	Increased Value on Limed Land	Percent Increase
Untreated	5.8	7.6	8 56.10	\$ 78.82	\$ 22.52	40.1	
PK	5.5	6.3	117.62	145.08	27.46	23.4	
PKN (Nitrate of Soda)	5.5	6.4	134.43	156.87	22.44	16.7	
PKN (Dried Blood)	5.2	6.6	114.29	156.77	42.48	37.2	
PKN (Sul. of Am.)	4.2	6.0	34.78	156.79	122.01	350.8	
8 Tons Manure	6.3	6.9	124.33	154.76	30.43	45.9	
Average	96.93	141.48	44.55	45.9	

¹ The three complete fertilizers represent the plots which have received the maximum of 72 pounds of nitrogen per acre—plots 28, 21 and 32 respectively.

Agricultural Limestone in Missouri

By O. T. COLEMAN

Extension Specialist in Soils, Agricultural Extension Service, University of Missouri

NEARLY TEN MILLION ACRES of unlimed Missouri farm land need applications of 2 to 3 tons of agricultural limestone per acre before their productivity can be most successfully maintained in a well balanced cropping and pasture system. After these acres have been limed, there will be required annually from 2 to 3 million tons to compensate for that lost by leaching and crop removal. Until these requirements for lime are met and maintained the successful production of legume crops in the cropping system and the most efficient use of land and labor in producing the tonnage of food and feed crops Missouri farmers are called on to produce cannot be attained. Furthermore the efficiency of this feed will not be at a maximum because feeding trials have shown that a unit of feed, especially forages and pasture, produced on limed land is much more efficient in producing livestock gains than when produced on lime deficient soils. In an experiment with lambs at the Missouri Experiment Station it was found that lime increased the yield of lespedeza by 30 percent, but the increase in mutton produced per acre was 50 percent. Surely liming our soils for maximum production cannot be considered lightly in wartime in view of these possibilities.

The county agents of Missouri reported that a total of 1,694,012 tons of agricultural limestone were used by the farmers of the state in 1942. Although this was somewhat more than the amount used the preceding year, it was 778,000 tons short of what they would have used had sufficient limestone been available. If this amount could have been available and had been used on lespedeza at the rate of 2 tons per acre this would have meant an additional 389,000 acres limed for the increased production and improved feeding value of this crop in 1943 and for possibly another 8 or 10 years. Since experimental trials have shown that the

combined increase in yield and in feeding value of lespedeza hay will amount to 50 percent, then by assuming that the lespedeza hay on the unlimed land could have been one ton per acre, this would mean a possible equivalent increase of 194,500 tons of hay. By considering that one ton of average lespedeza hay has a value equivalent to 19 bu. of corn and that it takes about 15.5 corn equivalents to produce 100 lbs. of beef then these 778,000 tons of lime could mean increased food production equal to 247,770 lbs. of beef.

Outlook For This Year Not Good

If we should assume that the demand for lime will be as great in Missouri in 1943 as it was in 1942 and, it will likely be greater because of the improved financial condition of the farmers, then the farmers of the state will plan to use approximately 2½ million tons this year. In order for this amount to be available for use, however, some of the obstacles which prevented them from getting ¾ million tons which they were ready to use in 1942 will need to be removed. According to a survey conducted among county agents the point regarding difficulty in getting repairs for crushers was checked by 19 as the reason why the tonnage wanted was not delivered, labor difficulties were checked by 43, lack of trucking facilities by 60, and other limitations, such as low prices of the product, weather conditions, etc., were checked by 46. Forty-four percent of the agents reporting believed that there would be enough limestone produced in their county to meet the demand, 45 percent believed there would not be, while about 11 percent were doubtful.

Probably one of the most wasteful and discouraging phases of the situation was the opinion of the county agents that only about 30 of the 131 small portable outfits in the counties would either not operate at all or would not operate at full capacity in 1943. This will mean that under present conditions about 101 of these crushers will be idle for a large part, or all, of the year. For the larger stationary commercial crushers the



O. T. Coleman

situation was considered brighter. Agents believed that 105 of the 134 of this larger type crusher would operate at full capacity leaving only 29 idle or not operating at full capacity.

The following statements received in connection with the survey represent type cases of the troubles and may throw some further light on the reasons for the present condition or give some ideas of the local and Federal aid that might be enlisted to relieve the situation.

"The limestone producer might possibly have filled his orders if he had not taken contracts for 15 or 20 miles of road work, in addition."

"The thing that doesn't show up is the thousands of tons that would have been ordered, if farmers had felt sure that their orders would have been filled. I know that ten to fifteen thousand additional tons would have been bought for cash, if we had been able to tell farmers that the material was available."

"The way to correct this situation is to stop letting A.A.A. contracts for more territory than any one plant can hope to supply."

"This county would use fifty thousand tons in 1943, if it were available."

"The man who had the contract purchased a used crusher and an old motor. When he first began working the motor caused considerable trouble. After this was corrected he was handicapped because of tire

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trouble and for a time was unable to make deliveries because of the tires not being good enough to carry the load. He also had some difficulty obtaining repair parts, especially the hammers of the crusher. Other difficulties which handicapped production included inexperience, small capacity of equipment, inadequacy of capital, and probably poor management."

"As far as I know, this portable crusher is the only one that will be operating, at not more than 25 percent capacity in 1943, which will be quite an improvement over the operating efficiency of 1942."

"Last year the contractor who bid this county in under Grant-of-Aid also got another county. He found he couldn't take care of both so left us sitting. The year before, 1941, the contractor moved in, took the cream of the crop and left the little men with small orders sitting. This year the contractor who bid this county in also has another county. His low price is putting our local crushers out of the picture."

"There won't be over one-fourth of the demand supplied. Crusher operators won't bid on the work because of the uncertainty of labor supply and trucking facilities."

"Many hundreds of tons were not ordered as farmers were informed additional limestone could not be delivered."

"Trucks could not get tires to deliver, also the contract prices were so low that truckers could not keep going. Prospects for deliveries this year are none too good except by rail."

"About 50-75 percent of the needed limestone will be produced in 1943. Labor is the number one problem. Tires and repairs are the second problem of importance."

Need Phosphate, Too

Agricultural limestone and phosphate fertilizers seem to work as a team in making it possible to attain maximum production in Missouri. The fundamental plan of maintaining the productivity of soils which this state follows supplies an adequate turnover of organic and nitrogenous matter either by the addition of crop residues and manures, or through the frequent and successful production of legume crops. Since there are not enough crop residues left or enough barn yard manures produced to do this, it is necessary to depend upon legumes, grown either in the cropping system or with non-legume pasture crops to supply the

amount not supplied by manures and crop residues. Limestone is needed on fully three-fourths of the land of the state in order to grow legumes successfully.

Since all but the most fertile soils of the state are low in available phosphorus, its use will result in a better balance of plant nutrients for all crops and bring about increased production of both legumes and non-legumes. When, as a result of lime and phosphate applications, heavier legume crops result in increased amounts of organic matter and nitrogen, it may be advisable to apply fertilizers containing potash as well as phosphorus in order to better balance the plant food ration; to supply the phosphate and potash re-

and to all the farm magazines in this area. A six-weeks series of radio talks are being broadcast, beginning Saturday, March 20. We have just completed a series of discussion meetings on soils and crops covering every county in the state. These had a total attendance of 14,194. At these meetings farmers gave evidence of an unusual amount of interest in methods of meeting the present production needs.

There has just been completed a summary of the reports from 100 farms covering 779 different fields where the value of lime and phosphorus were used. The average yield figures of these reports based upon opinions of the cooperators are the following:

ESTIMATED AVERAGE YIELD PER ACRE FROM SOIL TREATMENTS

Treatment	Yields in bushels per acre			Yields in tons per acre		
	Wheat	Oats	Rye	Lespedeza	Alfalfa	Legumes and Grass
No treatment	8.1	23.0	16.0	.97	1.0	.86
Phosphate alone	13.0	33.0	18.0	1.6	1.0	1.6
Lime alone	12.4	26.6	14.7	1.0	2.6	1.7
Lime and phosphorus	16.8	38.2	19.6	1.7	3.0	1.7

moved by the crop or to build up these elements sufficiently as balance for the extra nitrogen added by the heavier legume growth. When legumes are not grown frequently enough on the land or when sufficient barnyard manure or crop residues are not returned to the land to supply the organic matter and nitrogen needed for satisfactory production, fertilizers containing nitrogen become increasingly necessary. Because of the increased need for nitrogen used in making war explosives, its manufacture and use in fertilizers has been restricted. In view of this fact the use of limestone to make it possible to grow more legumes and to increase their efficiency in adding nitrogen to the soil becomes increasingly important.

Importance of Liming Being Emphasized

The importance of lime in meeting this situation is being emphasized in this state through publicity, meetings, radio talks, field demonstrations, etc. One or more news articles on the importance of lime are prepared almost every week for use in the Farm News Service which is sent to all the newspapers in the state

An estimated average increase of 58 percent in the amount of pasture received on the treated areas over the untreated areas was shown in 160 field reports. An increase of 80 percent in feed received from pasture was shown in 221 field reports. Reports from 451 fields showed 66.7 percent of them had better stands of legumes. Reports on 451 fields showed greener vegetation as a result of soil treatment. Less weeds were reported on 71.7 percent of 191 fields because of the soil treatment used.

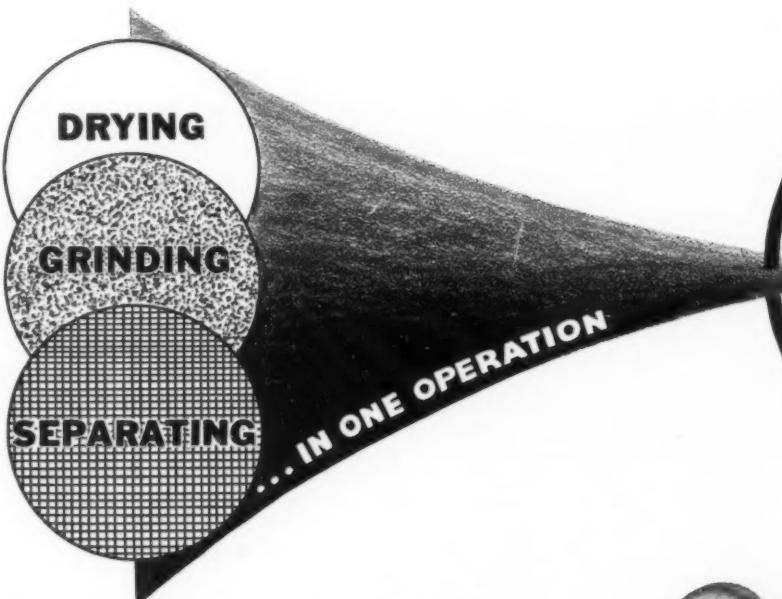
Larger growth was reported on 76 percent of 380 fields where soil treatments were applied.

Livestock were reported to prefer the vegetation that had received soil treatment on 59.1 percent of 286 fields.

The reports by these cooperators are merely verifications of some of the following experimental results which show similar effects of lime and phosphate upon yields, composition and pasture returns in various parts of the state. On the Southwest Missouri red limestone land—Newton Co., Stark City—of the 10 yr. average, figures were:

(Continued on page 70)

Treatment	Corn	Soy	Wheat	Clover
None	20.4 bu.	5.2 bu.	7.4	556 lb.
175 lb. 16 per cent Superphosphate	29.4	6.4	17.6	1812
2 T. lime				
175 lb. superphos.	36.1	7.2	19.3	3435



**A SHORT-CUT
METHOD OF
producing
AGRICULTURAL
LIMESTONE**

Big things are in the making this year for the fertilizer industry.

Record increases in farm production and nation-wide "victory gardening" indicate huge demands for limestone and acid phosphate.



For years a prime factor in the fertilizer field, Raymond Low Side ROLLER MILLS now are contributing to the efficient production of these essential materials.

In making the finer grades of agricultural limestone, where some drying is necessary, the mill handles both operations at once . . . removing the moisture and pulverizing the product to required fineness. It delivers the finished material direct to storage bins or to cars.



It is equipped with the air separation system, and adjustable for a wide range of classification, from all passing 10-mesh up to 95% through 100-mesh.



Low Side Mills are available in capacities as low as one or two tons per hour, and up to as much as twenty or thirty tons per hour.

They offer extra high tonnage-power ratios in pulverizing limestone and phosphate rock to present-day specifications.



RAYMOND PULVERIZER DIVISION
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RAYMOND

PULVERIZING, SEPARATING, AIR DRYING AND DUST COLLECTING EQUIPMENT

For further details of this economical producer, write for Raymond Low Side Roller Mill Catalog No. 34.

LIME AND FOOD

The influence of limestone and phosphate on the composition and yield of lespedeza—at Columbia in 1938—are well illustrated in the table below:

Soil Treatment	Yield lbs. A	N %	P %	Ca %	Delivery in Pounds per Acre		
					Protein	P	Ca
None	762	1.79	.19	.93	73.9	1.44	7.1
Phosphate	800	1.81	.20	.98	79.2	1.78	8.8
Phos.-Lime	1394	2.09	.19	.94	182.0	2.53	13.2

The effect of legumes, lime and phosphate used on permanent bluegrass pasture as helps in producing beef are well demonstrated from the following results at Lathrop, Good Grundy silt loam, Northwest Missouri, 1941:

Crops and Soil Treatment	Per Acre	Pounds Beef
Bluegrass alone—no soil treatment		97.5
Bluegrass with lespedeza seeded in it		137.5
Bluegrass and lespedeza with lime and phosphate		192.0
Bluegrass and sweet clover with lime and phosphate		237.5

Recommendations for the rates of broadcast applications of limestone in Missouri are usually made according to the soil acidity tests. These rates consider material having a calcium carbonate equivalent of 95 percent or better and ground finely enough so that at least 90 percent of it will pass a 10-mesh screen. Where it has a lower calcium carbonate equivalent or less than 90 percent of it passes the 10-mesh screen, proportionately larger amounts are recommended. For instance if limestone tests only 86 percent, approximately 10 percent more should be applied for equivalent results. For material coarser than 10-mesh the following table shows the extra amount recommended for best results, as based on sieve tests of over 200 samples sent to the Department of Soils, University of Missouri:

factory results any time the lime is available and then worked into the soil at the first opportunity. If there are no legumes in the permanent pasture they should be seeded.

particles that might clog and injure the drilling mechanism. If the lime and fertilizer are mixed together the mixture should be kept dry and drilled into the soil as soon as possible after mixing in order to avoid "caking." Some have found that with a certain amount of care, the seed and limestone or the seed, limestone and fertilizer can be mixed in proper proportions and all drilled at the same time through the grain hopper. This of course should be done only when a grain drill with a fertilizer attachment is not available. The drill must be in good working order and well oiled. Also it should be well cleaned, and washed well if fertilizer is included in the mixture, and the bearing parts well oiled immediately afterwards.

Crushed Stone

J. R. Boyd, administrative director, National Crushed Stone Association, has sent members a copy of a telegram sent to this association and the National Sand and Gravel Association in regard to the draft status of employes in these industries. The two associations acted in concert to have the situation clarified.

Draft Status of Industry Employes

The telegram reads:

"War Manpower Commission's committee on essential activities has not included the production of crushed stone, sand and gravel in its list of essential activities. However the committee clearly has excluded the production of these items from list of nondeferrable activities and occupations recently released. Would urge that employes of your industries remain on their present jobs except those specifically listed as nondeferrable until such time as an official announcement is received of change in status of this activity."

The telegram was signed by Collis Stocking, associate director, Bureau of Program Planning and Review, War Manpower Commission.

Mississippi Agstone Plant

AN AGSTONE PLANT has been opened by the State of Mississippi one mile west of Brandon on Highway 80. Under the direction of the State Lime Plant Board, machinery has been secured which will crush from 6 to 8 tons an hour which will be passed through a 10-mesh screen. A new International power unit is used.

PERCENTAGE OF LIMESTONE PASSING THE VARIOUS SIEVES

8-mesh	Average Per Cent Passing				Extra Limestone Neded for Best Results
	10-mesh	*12-mesh	40-mesh	100-mesh	
76 percent	65 percent	63 percent	32 percent	19 percent	50-60 percent
83 percent	73 percent	70 percent	37 percent	21 percent	30-35 percent
88 percent	79 percent	77 percent	42 percent	23 percent	20-25 percent
93 percent	86 percent	83 percent	45 percent	26 percent	10-15 percent
98 percent	93 percent	90 percent	52 percent	28 percent	None

* Regular 12-mesh fly screen.

For clovers and alfalfa, it is recommended that this limestone be broadcast and worked into the surface soil at least 6 months, or preferably a year or more previous to seeding. It may be spread on old lespedeza stands or on permanent pasture with satis-

beans than when the fertilizer alone is drilled with them.

Where 10-mesh limestone is drilled through the fertilizer attachment of a grain drill or corn planter it should first be sieved through a 6- or 8-mesh hardware cloth to take out any coarse

LIME AND FOOD

A.A.A. Attitude

(Continued from page 63)

maximum production of this important agricultural supply to farmers at prices no higher than were warranted by production and transportation cost increases, W.P.B. early reached the conclusion that existing quarrying and crushing facilities must be maintained in order that agricultural production might be sustained. It recognized that a long-term soil-building scheme could not be broken off during a war period without undermining the basic agricultural production structure of the nation.

The past can best be represented by a few figures. A summary of production would look something like this:

YEARS	PRODUCTION*
1931-35	3 million tons
1936-38	7 million tons
1940-42	15 million tons

*All liming materials produced annually.

The A.A.A. agricultural conservation program came into the picture in 1936. So-called A.A.A. limestone became an important factor in 1940. The amounts distributed through

A.A.A. channels have been these:

1938.....	38,000 tons
1939.....	672,000 tons
1940.....	3,222,000 tons
1941.....	9,773,000 tons
1942.....	11,492,000 tons

Outlook for 1943

How does 1943 look for "A.A.A. limestone?" It will not be a year of development. Generally, the problem is to hold the gains made in spite of labor shortages and overloaded transportation facilities. Its solution will not be easy. Spread-on-field service will be curtailed and in some areas abandoned. More responsibility for delivery will have to be shifted to farmers. Much will have to be hauled from railheads on farmers' trucks and wagons.

The time has come when limestone must stand on its own feet, carried on by the impetus gained over many years of education and experience. Those who produce it, those who experiment with it, and those who use it must unite in maintaining the high level of distribution. All along the line, those who have learned that limestone is vital to food, feed and fiber production must not fail to

shoulder the obligation to carry on in spite of handicaps.

The A.A.A. will continue to do its part. Its contribution is bringing the producer and consumer together. It will go on buying from the one and making available to the other, but it must concentrate more on the material and less on the transportation service. It is prepared to give its support to the maintenance of production facilities at the present level and of distribution facilities to an extent compatible with O.D.T. transportation conservation plans. This means that the farmer will have to show by affirmative action that he knows the value of limestone in crop production. It is the job of both the A.A.A. and the limestone producer to encourage him.

Tobin Quarries Expands

TOBIN QUARRIES, Kansas City, Mo., has taken leases on 3,040 acres of land owned by B. H. and Betty Lemert and 320 acres owned by Edith Yarbrough near Liberal, Kans. These properties have sand and gravel and stone deposits, and will be immediately developed to supply war contracts, according to local reports.

The Williams "SLUGGER" Crusher and Pulverizer Handles "ONE MAN" Stone • Saves Sledging

Also Makes 1 1/4", 3/4" or Agricultural Limestone in One Operation



CUTAWAY VIEW
of "Slugger" showing
heavy duty hammers,
liners and discs.

By reducing large rock to 1 1/4", 3/4" or agricultural limestone in one operation, the "Slugger" has enabled operators to produce these sizes at a low cost per ton and with small investment.

Features include—Manganese steel hammers, heavy duty SKF bearings, adjustable breaker plate, hammer adjustments overcome wear, economical to operate.

The "Slugger" is built in Seven Sizes—from 30 to 150 horsepower—write for illustrated bulletins today.

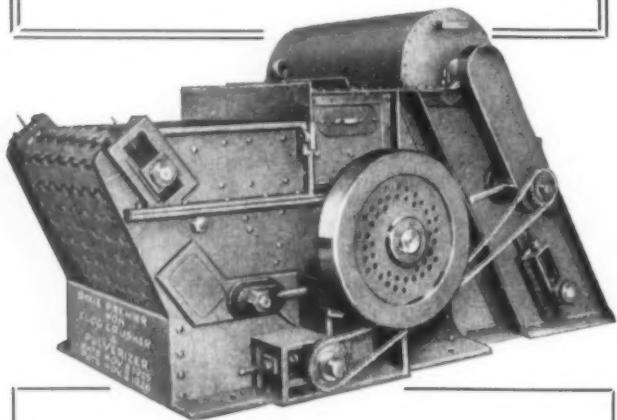
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DIXIE Non-Clog HAMMERMILLS

NOTE THESE TYPICAL TOUGH JOBS LICKED BY DIXIES

1. Replaced four crushers for high moisture content bauxite . . . cut power in half . . . reduced drying costs . . . increased production.
2. Efficiently crushing clay balls to reclaim phosphate in Florida phosphate plants.
3. Crushing phosphate muck in T.V.A. Tennessee plant.

HERE'S WHY . . .

The Dixie Non Clog Hammermill is the only crusher with a moving breaker plate. Provides positive mechanical feed. No manual pushing of material needed. Even the most plastic, wet, clayey material will not slow production or clog hammers. This feature alone has saved the cost of 10 men in one company!

And because the Dixie moving breaker plate can be moved forward or backward from the hammer points, quality and size of production can be controlled. This feature provides additional assurance against clogging. These are but two of Dixie's outstanding features. Send coupon below for free booklet, "More Efficient Crushing of Raw Materials" which gives complete facts.

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Please send free booklet on Dixie Non-Clog Hammermills. We want to crush . . .

Name

Company

Address

City State

Wisconsin Needs 15 Million Tons

(Continued from page 61)

In 1939 Wisconsin farmers purchased and applied a total of 42,000 tons; in 1940, 64,000; in 1941, 84,000; and in 1942, 132,000 tons of commercial plant foods were applied to Wisconsin farmlands. But even 132,000 tons represent only about 25 percent as much plant food as is needed to offset annual losses incurred in the sale of livestock, livestock products, cash crops, and the losses incurred in the handling of animal manures.

Agricultural extension has, I believe, done a good job in apprising farmers of their soil fertility problems. County agents and extension workers have paved the way for the advance of an army of salesmen and producers of commercial fertilizers and lime. We will continue to light up the horizon of our Wisconsin farms with educational incendiaries. I am sure that industry, if permitted, will come through with the production and delivery of plant foods and lime needed to keep Wisconsin in the front ranks in its output of vital war food.

Need Government Understanding

But we will need the continued support of our local war boards and our Washington administrative control boards in order to clear away restrictions that are constantly impeding and blocking our efforts to get limestone and fertilizers to Wisconsin farmers.

Steel must be supplied for the replacement and repair of grinding equipment; increases in the allocation by the W.P.B. of vital fertilizing materials needed in the manufacture of commercial plant food required by Wisconsin soils must be forthcoming; transportation facilities for the delivery of pulverized limestone and fertilizing materials must be kept wide open in order to permit increases in the use of the plant foods which are needed in our all-out efforts to increase agricultural produce. Compensation for the trucking of limestone will have to be stepped up in many localities in order to meet the competition of other wartime calls for these trucks.

The A.A.A. now contracts with private and commercial concerns for the production and delivery of most of the agricultural limestone used by Wisconsin farmers, but these contractors are finding it increasingly difficult to keep up production and deliveries due to competition for labor and trucks and the difficulties encountered in keeping their equipment in repair.

Wisconsin farms and farmers will do their part in producing the vital food, feed, and fiber products asked for if our soil fertility needs are met. The U.S.D.A. has set numerical goals for production in 1943. Our armed forces and allies need the food the government is asking for. But numerical goals mean little unless the actual plant food raw materials needed to feed our soils are furnished. Our Wisconsin farmers are unanimous in their cry, "Please pass the ammunition and we will produce the feed, food, and fiber you ask for." The coordination and cooperation of all state and federal agencies, working together with industry and transportation, will result in keeping up the steady flow of limestone and fertilizers to Wisconsin farms. A little more consideration on the part of our federal wartime agencies to the needs of agriculture will result, I'm sure, in all-out production by Wisconsin farmers in 1943 and the immediate years ahead.

BATCHING

By WALTER B. LENHART



General view of I. M. Ludington's Sons, Inc., ready mixed concrete plant in Rochester, N. Y.

Control Methods for Uniformity

Consistency of ready-mixed concrete maintained by moisture control system at plant of I. M. Ludington's Sons, Inc.

ONE common characteristic of a newcomer in the manufacturing field is his adaptability. He is usually keenly interested in new developments and methods that affect his particular industry, and is not at all reluctant about scrapping older methods and adopting the newer. As an illustration of this observation one can take the ready mixed concrete plant of I. M. Ludington's Sons, Inc., Rochester, N. Y.

This concern entered the field in December of 1939, and in two short years found that to make concrete of consistent quality they had to have better control of the operation. Especially important, it was observed, was the necessity of knowing the water content of the sand and gravel aggregates.

They first tried drying samples and from the loss in weight arrive at the percent water content, but this was too slow. As many as six trucks would be loaded and gone before the determination could be completed. The same could be said about the flask method of determining moisture which they also tried. Aside from the slowness of manipulation, these methods were open to criticism because no reliable record was kept of just what kind of concrete went out with each load. After a comprehensive review of available data,

they juked their older methods and adopted the methods and equipment of the Scientific Concrete Service Corp.

Percentage of water in sand can vary enough from one batch to the next to cause differences in the strength of concrete that may be of grave concern to the manufacturer of the concrete.

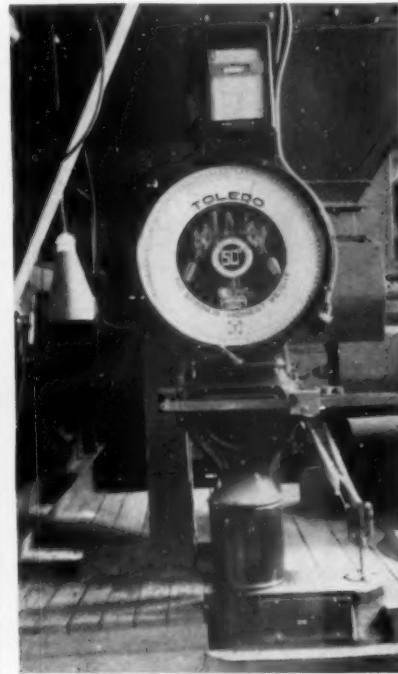


View of other side of plant with ramp in foreground for unloading aggregate trucks

To illustrate this we might cite one plant where the moisture determinations on 15 consecutive batches gave as much as 2 percent differences in moisture in the sand, with these variations occurring over cycles of three minutes. This two percent would mean 40 lb. of additional water, and if not compensated for in some quick manner would result in excessive slumps. This amount of water is roughly equivalent to 5 gal. of water per ton of aggregate. Or to put it into more illustrative form, if we made up a batch of concrete using 8000 lb. of gravel, 5000 lb. of sand, 1200 lb. of water, and 2100 lb. of cement, a variation of two percent moisture in the sand would cause a possible error of about 100 lb. of water or 12 gal. This would be equivalent to 0.43 gal. of water per sack of cement. This difference could cause a falling off of from 500 to 800 p.s.i. for 28 days concrete. This in turn means that less cement could have been used to get a certain definite strength of concrete. This saving in cement is the economic factor that may mean the difference between success and failure in a ready mixed plant.

At the I. M. Ludington's Sons, Inc. plant, after two years of operation using the methods and equipment of

BATCHING



Left: Scales for quick determination of moisture. The container at the left is filled with aggregate for weighing. Center: "Inspectograph" for recording exact component of each batch of concrete. Right: Scales for cement

the Scientific Concrete Service Corp. a uniformity of results has been obtained that has pleased both the owners of the plant and the users of the concrete.

Equipment to Control Uniformity of Concrete

The Scientific Concrete Service Corp.'s methods provide a quick, simple, accurate, and scientific method of determining moisture content of the aggregate. Water can be controlled with almost laboratory accuracy (within one gallon per yard of concrete).

In practice moistures are determined on a Toledo beam dial scale graduated for specific gravity and moisture determinations. It is accurate to 1/100 of a pound.

After the moisture determination, the operator weighs the aggregate on a second Toledo beam dial scale with certain additions and refinements that compensate for the moisture in the aggregate. It is not the purpose of this article to go into the rather complicated details of how the method and equipment functions as it would be difficult for one to follow out the refinements that are incorporated in the design, but it is the intent to point out the success and satisfaction experienced by these operators using modern technique.

When the materials are weighed out, all the materials entering into the concrete are automatically recorded on an inspectograph. This device, made by Esterline-Angus, keeps an accurate and sealed record of just what went into each batch of concrete. In some states this record has been accepted by the courts as legal evidence as to the grade and type of concrete sold.

At the I. M. Ludington's Sons, Inc., plant a third set of Toledo scales are used for the cement. Three different brands of cement are carried in stock and suitable chutes are provided at the weighing hopper so that any brand can be used. It is delivered in bulk. The cement is loaded and weighed separately from the aggregates. In other words, the trucks are first charged with the aggregates and water, then it pulls ahead to the cement hopper. It is said that using the two-spot-loading system that greater plant capacity can be attained. This plant has a capacity of 60 cu. yd. per hour with actual output at times going to 66 cu. yd. per hour.

Actual time required here for a load is 2½ to 3 minutes, and it requires less than one minute to make the moisture determination, which figure is included in the above total time per cycle. By using an additional man at the hoppers, during rush

periods, every batch can have its moisture content determined and corrections made for each batch, all without holding up the operation a single minute.

The company uses ten Jaeger trucks and one Rex. During peak rush periods Blaw-Knox trucks are available on a rental basis.

Method of Handling Aggregates to Batch Plant

Sand and Gravel are delivered to the plant by trucks that dump to six ground storage bins, with each type of material kept separate by wood partitions. The trucks unload from a ramp over the storage pockets.

Aggregates are then delivered to Butler bins by a Brownhoist, steam, railroad type clamshell rig. For winter operations, gravel is heated with live steam and hot water used in the mix. Two kinds of sand are usually used so as to get the desired blends.

The company has a second ready mixed plant in the Rochester area that is used during rush summer periods. It does not have heating facilities for the water or aggregates.

Offices of the company are at 720 Lexington Avenue, Rochester, N. Y. Charles Ludington is president. George A. Butler is vice-president and in active charge of the company, and Ward Carpenter is treasurer.



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On YOUR Coal Stripping, Air Base, Cantonment, Levee Building or General Construction job—PAGE AUTOMATIC DRAGLINE BUCKETS will BOOST PRODUCTION . . . make the most of Manpower and Machine!

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Automatic
DRAGLINE BUCKETS

BOOST PRODUCTION . KEEP AMERICA STRONG

WHY and HOW to Keep Your Jaeger Truck Mixers Rolling to Victory



In 2 years of war building, the ready-mix industry has made 10 years' progress in educating contractors to the advantages of mobile, flexible concrete delivery.

With the economic value of the truck mixer established, and raw materials abundantly available, operators face a bright future—provided they can continue to maintain satisfactory service to concrete users with their present truck mixer fleets.

YOUR JAEGER'S WILL SEE YOU THROUGH

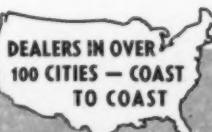
They're engineered for long life, low upkeep—self-cleaning drums without pockets or corners, simple and trouble-free water system, shock-proof 2-speed transmission, better mounting and weight distribution, highest type automotive construction thruout. As near as your telephone is a Jaeger distributor with complete stocks of repair parts. Jaeger traveling engineers are on call to help you with major problems.

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Now that war regulations limit the building of new truck mixers, we recommend two maintenance measures:

1. Make every driver responsible for his unit. Send for Jaeger Instruction Manuals and insist on careful operation and daily cleaning and lubrication as specified.
2. ARRANGE WITH YOUR JAEGER DISTRIBUTOR FOR A REGULAR 30-DAY CHECK-UP ON EVERY MACHINE.

THE JAEGER MACHINE COMPANY
603 DUBLIN AVENUE, COLUMBUS, OHIO



Mexico Increasing Capacity of Cement Industry 60%

Business Opportunities in Cement and Lime in Mexico and Central America

(Contributed)

DUE TO THE EXTREME scarcity of cement in Mexico for use in national defense and for other government agencies, as well as for industry and private constructions, the

Mexican Government found it necessary to intervene in the affairs of the cement producers to insure a sufficient supply of cement for government works, and to avoid a con-

tinuance of the speculation that had been going on in cement by individuals as well as others who were creating difficulties for the industry.

As a result, the Ministry of National Economy during August, 1942, called a meeting of all cement producers in Mexico to discuss ways and means of supplying the Government with its requirements for cement, together with ways and means to control speculation which had been going on in the cement markets.

Immediately following these meetings a Government Decree governing the distribution and control of cement appeared in the Diario Oficial, publication of the National Government, and bearing the signatures of the Constitutional President of the United States of Mexico, Gral. Manuel Avila Camacho; the Minister of National Economy, Sr. F. Javier Glaxiola; and the Minister of Government, Sr. Lic. Miguel Alemán. A rough translation of the decree follows:

Considering:

That in view of the fact that most important federal works are being carried out in the republic, and must be completed, not only from the social and economic viewpoint, but also taking into consideration that a national emergency exists created by the actual state of war existing with Germany, Italy and Japan, it is necessary to assure a complete and punctual supply of cement for these works, without limit;

That cement required for government works must be rationed and supplied economically, taking into account the location of these works as well as the location and capacity of all factories producing cement in the republic;

That the consumption of cement by the Federal Government may result in a scarcity of the product in the open markets, until such a time as the actual cement factories increase their capacities through the installation of additional equipment, and new factories are placed in operation, it has been decided to decree the following:

Decree:

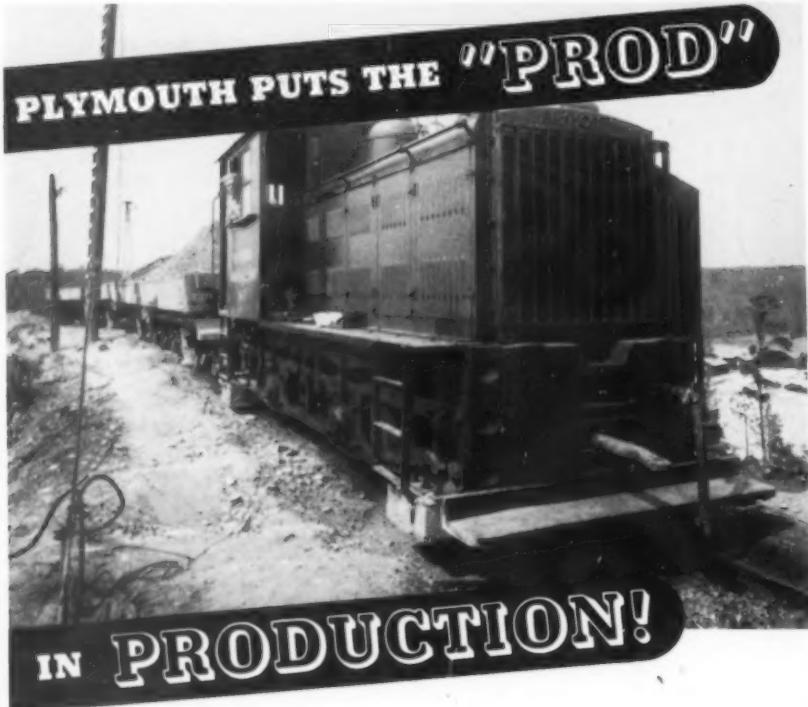
1. The former decree published June 15 of this year (1942) will be considered null.

2. A National Commission of the Cement Industry, with headquarters in Mexico City will be formed, and composed of the Minister of National Economy and one representative of each of the cement factories in the republic.

3. The principal object of this Commission will be to provide the Federal Government with all of the cement it requires and to take measures to avoid speculation in cement during the period there continues to be a scarcity of this product.

4. The Commission will provide the Minister of National Economy with the names of all the authorized distributors and agents of each cement factory, and the ministry of National Economy will in turn issue to each of these sellers of cement, a license permitting them to sell. These licenses may be canceled upon request of the various cement companies.

5. The Commission will study the prices at which cement should be sold by agents and distributors authorized to



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Top tonnage . . . extreme efficiency . . . low initial cost . . . minimum maintenance . . . reliable ruggedness . . . all contribute in the **drive to Victory!**

Plymouth Locomotives are gasoline or diesel powered . . . for low operating economy. Get the facts and figures . . . TODAY — then plan your production with **Plymouth** performance.

PLYMOUTH GASOLINE and DIESEL LOCOMOTIVES

PLYMOUTH LOCOMOTIVE WORKS
Division of The Fafe-Roat-Heath Co., PLYMOUTH, OHIO, U. S. A.

do so, and periodically provide a list of these prices to the Minister of National Economy.

6. The Commission will have vigilance over the authorized distributors and agencies for cement sales and see that they operate in conformance with this decree. On the contrary, and without the cement companies being subject to fines, the cement factories agree to cancel such distributors or agents who do not comply with the decree, and the Minister of National Economy can cancel the licenses of such distributors and agents.

7. The Commission is the proper authority to receive any and all complaints having to do with the distribution of cement and its prices, to investigate same, and to render a report to the Minister of National Economy.

The above agreement between the Ministry of National Economy and the cement producers was signed August 3, 1942, as follows:

CEMENTOS ATOYAC, S.A.
by Alton J. Blank
General Manager.

CEMENTOS GUADALAJARA, S.A.
by J. Lacaud
Vice President.

CEMENTO DE MIXCOAC, S.A.
by K. Bannister
General Manager.

COOPERATIVA MANUFACTURERA DE
CEMENTO PORTLAND LA CRUZ AZUL,
S.C.L.
by Arcadio Hernandez
General Manager.

COMPANIA MEXICANA DE CEMENTO
PORTLAND APASCO, S.A.
by Ramon Salido
General Power of Attorney.

LA TOLTECA, COMPANIA DE CEMENTO
PORTLAND, S.A.
by F. Sanchez Fogarty
Sales Manager.

At a later date the following additional signatures were added:

CEMENTOS MEXICANOS, S.A.
by Jesus Barrera
General Manager.

CEMENTO PORTLAND NACIONAL, S.A.
by Ygnacio Soto
President and General Manager.

Additional Capacity

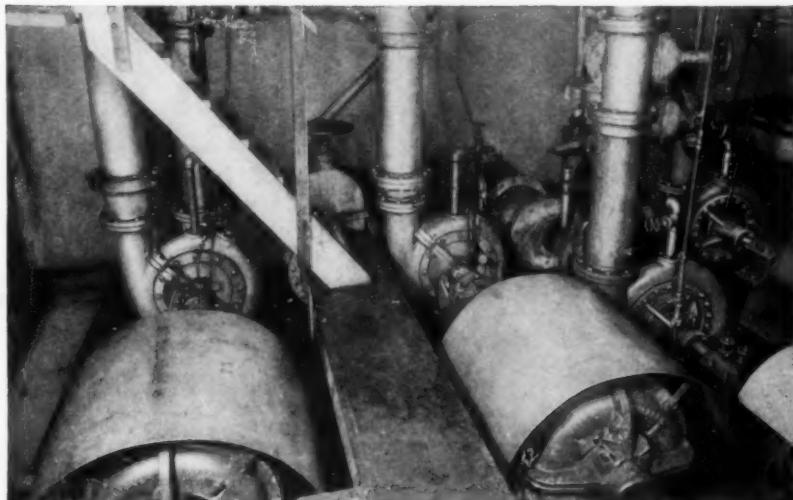
At the meetings of the cement producers with the Minister of National Economy it was roughly estimated that the increase in capacity of existing cement factories, together with added capacity of the two new factories under construction, would during the year 1943 further increase the present cement producing capacity in Mexico by about 60 percent.

Cemento de Mixcoac, S.A., with factory in Mexico City, is installing a large kiln which will be the largest in the republic.

Cementos Atoyac, S.A., with factory in Puebla, Mexico, is installing a new kiln and lengthening one of its small kilns.

Compañia Mexicana de Cemento Portland Apasco, S.A., is installing a new kiln at Guadalajara, Jalisco.

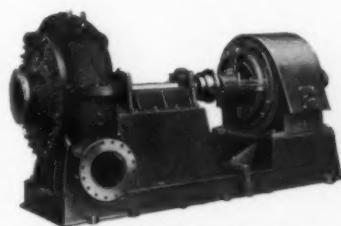
Cementos Guadalajara, S. A., with new three kiln factory started operations during February, 1943.



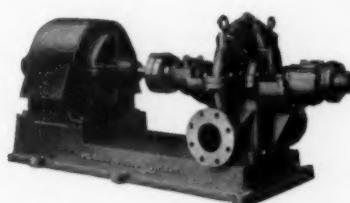
PUMPS . . . that are not merely "adapted to" but DESIGNED FOR . . . YOUR REQUIREMENTS

MORRIS has twelve different types of centrifugal pumps for handling abrasive materials such as slurry, sand, gravel, etc . . . five different types for handling pulpy materials such as sewage, paper stock, etc . . . and a standard type for every clear water service.

Therefore, whatever your pumping requirements may be, you can be sure of an exactly suitable Morris design . . . not merely an "adapted" design. Your benefits are higher efficiency . . . longer service . . . lower maintenance expense. Write for bulletin on the Morris design for your needs.



Heavy-Duty Lined Dredging Pump



Double Suction Horizontally Split Pump
for Clear Liquids

MORRIS MACHINE
WORKS

MORRIS
ESTABLISHED 1864

BALDWINSVILLE
NEW YORK

CENTRIFUGAL PUMPS

Cooperative Manufacturera de Cemento Portland La Cruz Azul, S.C.L., at present has a new factory under

construction in the state of Oaxaca, and this will be in operation later on in the year 1943.

Business Opportunities South of the Border

MEXICO and Central America today probably offer more opportunity to the investor than is to be had in any other section of the world, and capital invested today in the development of new as well as needed industries will tomorrow pay high dividends on the investment. Mexico,

and the Central American countries (Guatemala, Salvador, Nicaragua, Costa Rica, Panama, Honduras, British Honduras), at first glance to the visitor from the industrialized United States, appear indeed to be backward countries, having few industries, and resources that have been scratched

only on the surface. Revolutions and revolutionary governments in these countries in the past are greatly to blame for this condition. However, with the advent of the good neighbor policy, followed somewhat later as a result of World War II by lend-lease, these countries stabilized their several governmental policies and became red-hot enthusiasts of the democratic government fostered by the United States, instead of lukewarm observers as formerly. As a result, all of these countries now look to capital from the United States to open up and develop their countries, and have taken the necessary corrective steps to see that the investor is amply rewarded and his interests protected. Industry could in general be discussed here, but only that having to do with the cement and lime production fields will be considered.

Cement Consumption Compared

For comparative considerations it may be mentioned that the United States, with a population, roughly, of 130,000,000 people, have about 165 cement factories which during the year 1942 produced about 33,135,000 metric tons of cements. Mexico with a population of about 22,000,000 people, and 8 cement factories (two additional cement factories are under construction) produced about 575,000 metric tons of cement during the year 1942. For a great many years there was only one cement factory in all of Central America, this being located in Guatemala and having a nominal annual productive capacity of 21,000 metric tons. Recently a second small cement factory has been constructed in Nicaragua which has a nominal capacity of 22,000 metric tons yearly. A rough idea of the cement consumption in each of the countries, per capita, is given below:

TABLE I—POPULATIONS OF AMERICAN REPUBLICS

Country	Population
United States	130,000,000
Mexico	22,000,000
Guatemala	2,420,000
Salvador	1,632,000
Honduras	1,000,000
Nicaragua	850,000
Costa Rica	592,000
Panama	535,000
British Honduras	55,000
Canal Zone	44,000

TABLE II—PEOPLE PER METRIC TON OF CEMENT CONSUMED PER YEAR

Country	For Each Metric Ton of Cement Consumed	
	United States	Mexico
United States	3.09	38.26
Mexico	115.23	46.63*
Guatemala	125.00*	38.63*
Salvador	16.91	15.29
Honduras	50.00*	
Nicaragua		
Costa Rica		
Panama		
British Honduras		

*Estimated.



Why EAGLE Washers Produce Better Aggregates, Faster

Exclusive patented features, developed through years of experience make maximum use of specific gravity in washing and conveying. Eagle Sand and Gravel Washers operate on the same principle, removing foreign material from the aggregate by means of an upward current of water from the bottom. Water is regulated to give required upward current for the full working length of the tub.

Why EAGLE Washers Wear Better, Work Better

Timken Roller Thrust Bearings are used in the housing at upper end of tub, which takes all the end thrust of a screw shaft. Flights are made from a special iron and the metal is deeply chilled to insure long wear. Bronze sleeves are pressed on lower end of shaft to eliminate rust accumulation and prolong shaft life. Drive gears and pinions are steel, cut on precision machines, to insure easy running and full power transmission.

Why EAGLE Owners Have High Priority Ratings

Because finest aggregates are essential to war industry construction and production Uncle Sam has made it possible for us to keep Eagle Washer owners supplied with repair parts, maintenance and engineering service.

If You Need Parts

Or Repairs for—Spiral Screw Washers, Paddle Type Log Washers, Sand Tanks, Sand Dewaterers, Shale Removers, Sand and Gravel Crushers, Swintek Screen Nozzle Ladders. Write to us.

EAGLE IRON WORKS

DES MOINES, IOWA

Taking Mexico and the seven Central American countries, with a total population of about 30,000,000 people, there is consumed about 1 metric ton of cement yearly for each 40 people, as compared with the consumption of 1 metric ton of cement in the United States for each 3 people.

Imports Cut Off

Shortly after the start of World War II exports to and imports from the old world were cut off almost entirely, and coastwise shipping to and from the United States was restricted considerably as a result of submarine warfare. As a result, shipping for some time was limited to railways from the United States to Mexico over the two main railways starting at the U. S.-Mexico border and converging in the interior at Mexico City. More recently, with the connecting of the Mexican railway system with that of Guatemala, whose railways in turn connect with one traversing Salvador, through shipments from the U. S. to and through Mexico to Guatemala and Salvador are possible. The Pan-American Highway as a source of freight traffic, exists at present only from the U. S. to parts of Mexico.

Prior to the war the Central American countries, themselves large exporters of bananas and coffee to European and Scandinavian countries, imported the major amount of their cement and lime requirements from Germany, Italy, Jugoslavia, and from Norway, Denmark and Sweden. Since the war these countries have largely had to do without both cement and lime. Formerly the fruit boats from the Central American republics made deliveries to European and the Scandinavian countries, and instead of returning with ballast, brought back cargoes of cement and lime, which were available at extremely low cost, and more often than not obtainable through the barter system, or one involving long term credits, or systems involving the old time dumping system. None of these systems could be profitably met by producers of cement and lime in the United States largely because of the higher wage standards prevailing in the latter industries, and the extremely high inter-American ocean freight rates. Also, these industries in the U. S. were reluctant to establish systems of credit, or were generally unable to meet the more generous terms extended by firms in the old world, backed by government subsidies.

As a result, and possibly with the sole exception of the Canal Zone,

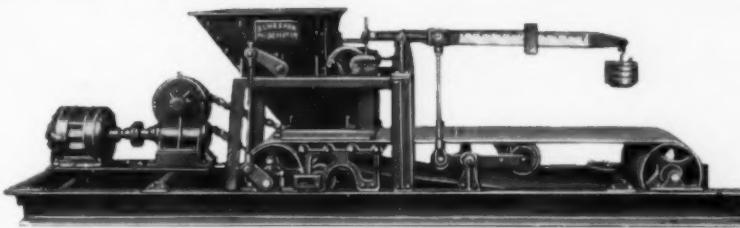
little or no cement or lime found its way into Central American markets from the U. S. At the start of World War II and the gradual involvement of most European countries, this latter market for the products of Central America was cut off, as was the importation of cement and lime.

For a short period, and until the entrance of the U. S. in the war, and the period of submarine warfare that immediately followed and interfered with ocean shipping, such cement and lime as found its way into the Central American markets came from the U. S., shipments being made

from San Francisco on the Pacific Coast, and from New York, Norfolk, New Orleans and other Atlantic Coast and Gulf ports. The cement and lime involved originated mainly from factories in California, and from the cement and lime producing districts in the immediate vicinity of New York, Philadelphia, New Orleans and Houston.

Prior to World War II cement was laid down from Europe alongside Central American wharves at prices ranging anywhere from \$6 to \$8 (U. S. currency) per metric ton. These prices are now upwards of \$30

SCHAFFER POIDOMETER



Fast, Accurate, Economical in Proportioning Materials

Schaffer Poidometer may be counted upon to step up output and to maintain exactness in the proportioning of materials at all speeds. Sturdily built to stand up under the fast tempo of wartime production its use assures both accuracy and economy.

If you have a proportioning problem—raw or finished materials—write for Catalog No. 2

SCHAFFER POIDOMETER CO.

2828 Smallman St.

Pittsburgh, Pa.

per ton, with little or no cement and lime available.

Hydrated Lime for Banana Plant Disease

It should be pointed out here that the tremendous demand for hydrated lime throughout the banana producing republics is the direct result of the "Chamusco" disease which for a number of years has caused havoc with banana plants. Little or no hydrated lime finds its way into construction. Generally, a mixture composed of 50 percent hydrated lime with 50 percent copper sulphate,

when sprayed on banana plants has been found effective in combatting the disease. In recent years the "Chamusco" disease has spread alarmingly and the amount of hydrated lime consumed in combatting the disease has assumed large proportions. While accurate figures are not available, it is estimated that 8,000 metric tons of hydrated lime are used each year in Panama in combatting the "Chamusco" disease; and a similar tonnage is used in Guatemala, Honduras and Costa Rica. Recently a market for hydrated lime for this purpose devel-

oped in southern Mexico. The consumption of hydrated lime for this purpose should tend to increase.

Cement Possibilities

The pre-war consumption of cement and lime in Mexico and the Central American republics should become a drop in the bucket to the demand that will be created for these products now that industrialization seems at the point of setting in. With the termination of the Pan-American Highway between the U. S. and the Panama Canal most of the intervening Latin American countries will branch out and develop boom-time proportions as the result of the opening up of hitherto undeveloped resources and means of communication and transportation. Latin American countries are extremely anxious to have new industries to aid in the development of their countries, and are willing to grant generous franchises and concessions to well meaning investors. As concerns needed cement and lime industries Latin American governments are not only offering tax free concessions for periods up to 20 years, but are offering government lands for quarries and plant sites, as well as waiving all import duties on materials and machinery going into their manufacture, and protective tariffs to protect these new industries. Other attractions and incentives to new industries is cheap labor.

Mexico with eight cement factories in operation (the total capacity of these factories is being increased considerably) and two factories under construction, which should result in a 60 percent increase in production during 1943 over that had in 1942, will in 1944, on the basis of present calculations, still have a demand of 150,000 tons of cement more than the capacity of the industry to produce. This estimate covers present planned construction, and not possible consumption such as for concrete roads, which is being considered. As a result, two or three additional small cement factories, strategically located, will be required in Mexico. In Panama, Costa Rica, Honduras and Salvador, small cement factories are necessary in each country.

Peat as Fuel in Cement Manufacture

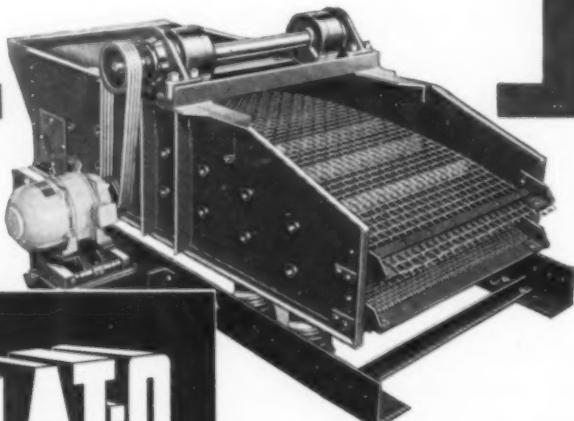
EXPERIMENTS are being made in Denmark with the use of peat in the production of cement. Exclusive use of peat proved too costly, however, so the cement industry decided to mix coal with 30 to 40 percent peat.

NOT A DEAD SPOT in the entire screening area

One of the first things operators notice — upon installing smooth running PLAT-O Vibrating Screens — is increased grading capacity per square foot of screen cloth . . . and, consequently, increased production of aggregates.

This is true of PLAT-O screens because their opposed elliptical throw and flat screen angle utilize every inch of the cloth surface. That's what PLAT-O operators mean when they say, "There's not a dead spot in the entire screening area."

Why not learn for yourself just HOW and WHY this and other exclusive PLAT-O features will improve your production and profits. You'll find the complete story in the booklet, "Better Sizing — CHEAPER." Your copy will be sent on request.



DEISTER
MACHINE CO.
Fort Wayne, Indiana

CONCRETE PRODUCTS AND CEMENT PRODUCTS

Sample Room Sells Products

Some of the interesting precast concrete specialties made by the Kissell Concrete Block Co., Johnstown, Penn., on display in the sample room

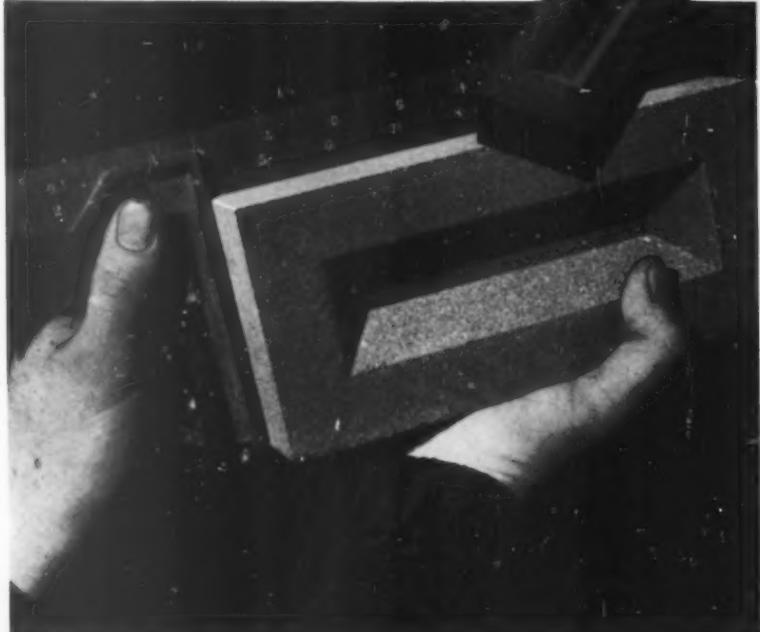


28,000 BRICKS IN ONE EIGHT HOUR SHIFT WITH THE J&C BRICK MACHINE



Smart operators find Jackson & Church units to be highly profitable installations. They eliminate the need for costly pallets. Gravel pit fines are ideal for brick making in a J & C press.

Below: Because of their even texture, sharp, square corners and perfect uniformity, Jackson-made bricks are winning the praise of contractors and architects from Maine to California.



Either frog-type or solid concrete bricks can be produced at the rate of up to 14,000 in an eight hour day (on model C machine shown here) or up to 28,000 per day on the larger type A machine.



Above: The Jackson and Church plant shown above was constructed of J & C made bricks. Producers find that J & C made bricks are easier to sell because of their uniformity, quality and appearance. J & C units produce plain or colored bricks from Haydite, Waylite, Superock, Pottoco, cinders and other light weight aggregates. From a single sack of cement, with a J & C machine, up to 320 concrete bricks can be made, with strengths as high as 3700 pounds per square inch and absorption as low as 6%. For complete information write to Jackson and Church Co., Saginaw, Mich.

JACKSON AND CHURCH COMPLETE
BRICK-MAKING PLANTS

Selling the Farm Market

Kissell Concrete Block Co. promotes sales to farmers by constructing all buildings of concrete masonry on demonstration farm

WAR has left its mark on the concrete products business by causing many changes where the manufacturer's products require reinforcing iron. The War Production Board has stopped the use of reinforcing steel in all products, like concrete burial vaults.

The Kissell Concrete Block Co., Johnstown, Pa., ordinarily market around 100,000 block per season, but specialize, more or less, in concrete burial vaults. With the falling off of the market for block and a total stoppage in the use of reinforcing, J. D. Kissell, president of the company, and his brother, A. E. Kissell, vice-president, decided now was the time to do something about it. Sensing that farm construction would be permissible under priority rules, he got busy on his own farm and completed an extensive program that he started in 1940 whereby his own farm

By WALTER B. LENHART

buildings; home, barn, milk house, silo, chicken house, corn crib, etc., were constructed of concrete block and concrete. It is a 100 percent concrete job. He did this solely to have something to point to when trying to sell others in his market area.

All the farm buildings—floors, roofs, partitions, etc.—are their own lightweight block made with crushed coke as the lightweight aggregate. This product is easily and quickly available in his section as a by-product of the many coke ovens now feeding the steel industry.

In working out the details of this program they hit upon several innovations, among which might be mentioned the pre-cast concrete mangers that are built in units for ease in handling. Any number can be incor-

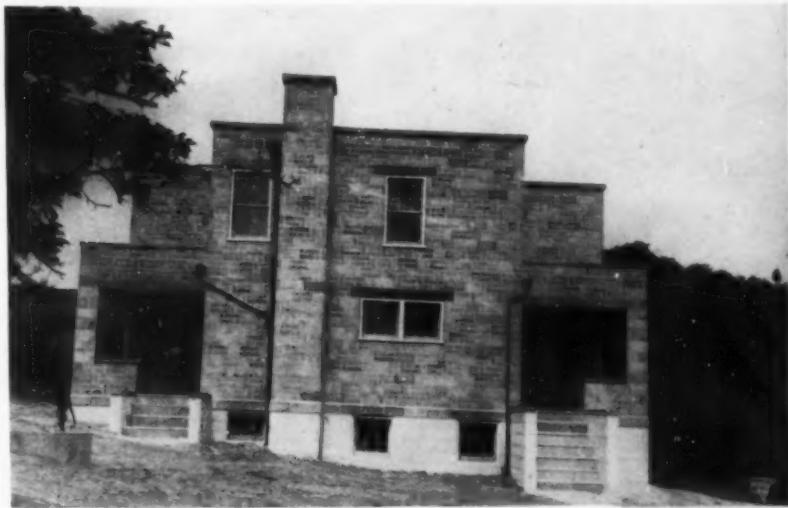
porated into the barn structure as the needs require. These units are cast at their Johnstown, Penn., factory located at Murdock and Oak streets. Each unit contains a small amount of steel reinforcement and are so designed that 2-in. pipe can be added to the assemblies for stalls. They also have provided a U-bolt cast into the units for ease in handling. Once installed, this U-bolt can be used for a hitching point for small calves and thereby kept near the mother cow if desirable.

The Kissell Concrete Block Co. also has built pre-cast hog troughs. These are about 4-ft. long and are sturdy. It is guaranteed that the pig won't "nuzzle" them around or break them.

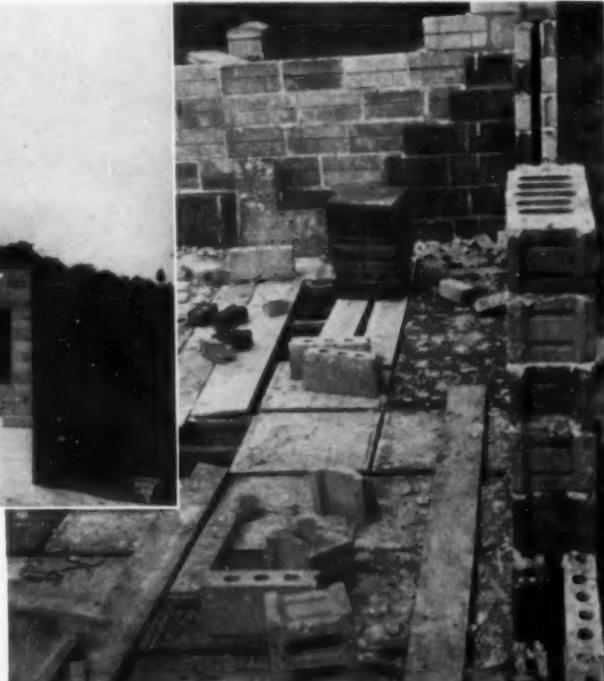
Square Silos of Concrete Block

The silo is one of the most interesting (and important) features as

(Continued on page 86)

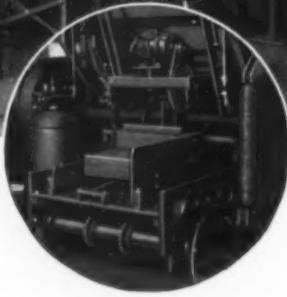
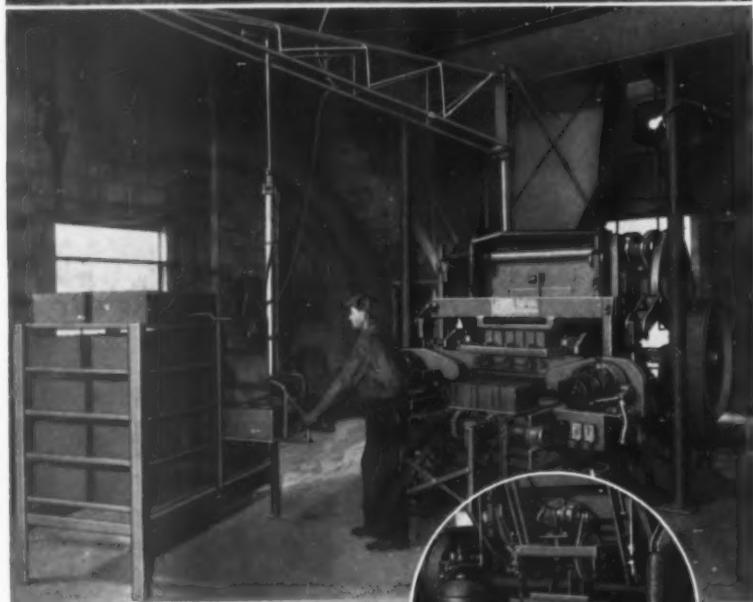


Above: Farm house built entirely of concrete masonry walls, concrete joists, floor slabs, sills, and lintels



Right: Showing double-wall construction, joists, and floor slabs in place before placing poured concrete

LEADERS in the Concrete Products Industry



For America!
THROW YOUR SCRAP
INTO THE FIGHT!
AMERICAN INDUSTRIES
SALVAGE PROGRAM



Sylvester Linton, Proprietor of Linton Concrete Products, Tonawanda, N. Y., started as a very young man with his father in the manufacture of concrete products. He became a Besser user in 1940, purchasing a Victory Tamper which he still operates. His second Besser machine, a Super Vibrapac, was installed early in 1942. These two Besser machines have been for some time, and still are working practically 100% on blocks for war building construction.

This is the sixteenth of a series of advertisements featuring leaders in the concrete products industry who have installed Besser Vibrapacs to step up production of high quality concrete masonry units. Reprints of previous advertisements sent on request.

using Besser Plain Pallet
VIBRAPACCS
in War Production

QUAL

Besser S
Mixer a

BES
VIB

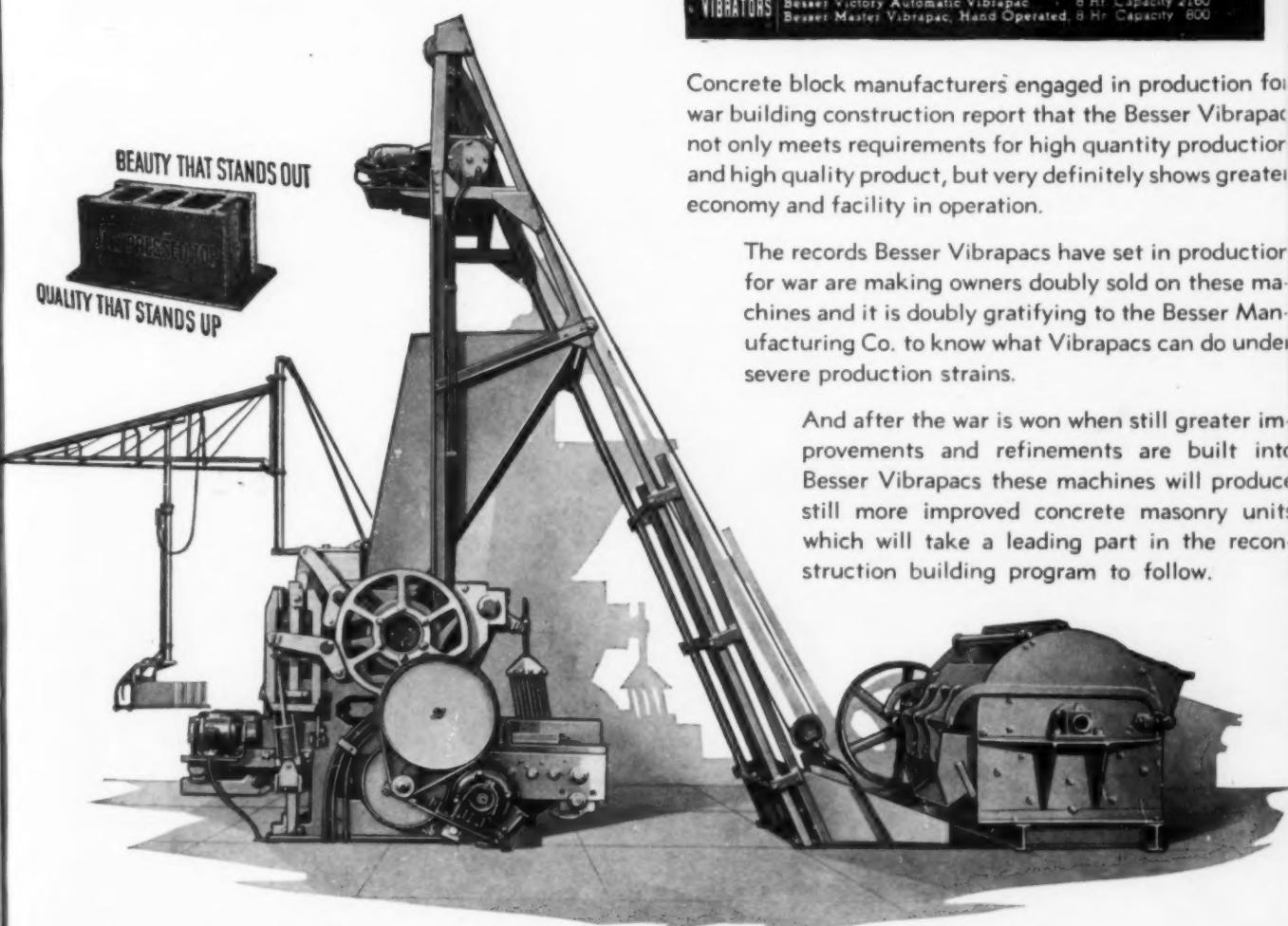
Greater Production and Greater Economy

BESSER PLAIN PALLET STRIPPERS

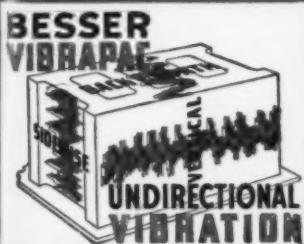
A Besser Plain Pallet Stripper For Every Need

Besser Super Automatic	8 Hr. Capacity 3120
Besser Victory Automatic	8 Hr. Capacity 2160
Besser Semi Automatic	8 Hr. Capacity 1680
Besser Champion, Power Operated	8 Hr. Capacity 1000 to 1200
Besser Multi-Mold, Hand Operated	8 Hr. Capacity 250 to 350

Besser Super Automatic Vibrapac	8 Hr. Capacity 4800
Besser Victory Automatic Vibrapac	8 Hr. Capacity 2160
Besser Master Vibrapac, Hand Operated	8 Hr. Capacity 800



Besser Super Automatic Plain Pallet Vibrapac with Mixer and Skip Loader. Capacity 600 8"x8"x16" per hour made 3 at a time on one plain pallet. Smaller units made in larger multiples on the same pallets.



Important Patent Notice

Licensed under the Gelman basic vibration patents.

Unidirectional vibration licensed under Flans patents.

The Vibrapac combines vibration with exclusive patented Besser Plain Pallet principle.

BESSER MANUFACTURING CO.

204 Forty-Third St. • Alpena, Mich.

Complete Equipment for Concrete Products Plants

THE SAVING IN PALLET COST WILL PAY FOR A BESSER VIBRAPAC PLAIN PALLET STRIPPER

MERCHANDISING



Left: Concrete mangers constructed in sections. Right: Small corn crib to show type of construction for ventilation

(Continued from page 83)
it is built square and all units are ordinary lightweight block. Interior corners are rounded off to insure that there are no air pockets when filling, and to prevent silage holding up. Every third row $\frac{3}{8}$ -in. reinforcing iron (galvanized) is used with $\frac{1}{2}$ -in. or $\frac{5}{8}$ -in. in the front or where there is a door or other opening. The silo at this farm is 8- x 8- x 22-ft. high. A 30-ft. silo will only require 300 lbs. of reinforcing iron, and Mr. Kissell feels that he can get that amount through the priority boards for farm purposes. The reinforcing irons are laid in a groove on the top of the block and parallel to the long axis. The two ends of each 8-ft. reinforcing iron are bent down at the edges a few inches and embedded in concrete so that the four walls are tied with this bond every third row. The company has on hand several orders for 30-ft. silos and they expect to do a nice business in this field alone, when the weather warms up.

Their biggest sales talk is to take prospective clients to their farm near Bedford, Penn., on Highway 56 and show them the silo that has been in use two years and is flawless in its construction details. Farmers were especially impressed when they saw silage unfrozen even when the thermometer hits ten below zero. The blocks, being thicker than staves, and of porous construction, are almost weatherproof and prevent freezing. Here he has a sales tool that is going to take him far, war or no war, and it is something that other producers could well study.

Another feature of the silos is the low cost. President Kissell states they can be built much faster and far cheaper than any other type of silo in his sales area.

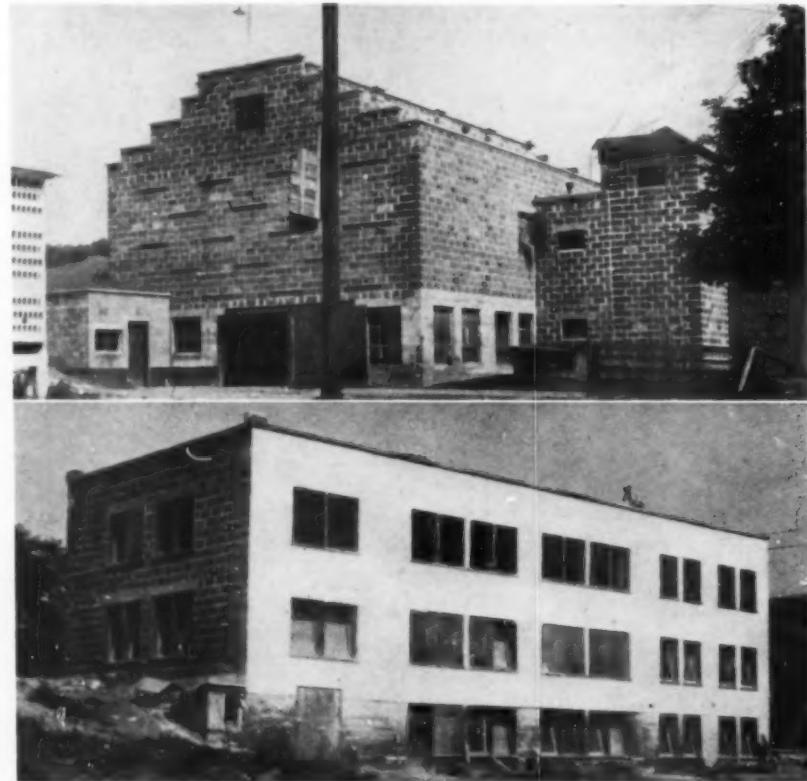
Here, we think, is a fine example of salesmanship and one that the

concrete products producers can think about. This simple fact is emphasized when one sees the total assembly of farm buildings.

Take the corn-crib, for example. This requires no special block, but is made of 8-in. units made 4-in. high set on edge, and to keep out rodents the inside is lined with cheap $\frac{1}{4}$ -in. hardware cloth. When other farmers see this type of construction, its ease of construction, its infinite life, and the fireproof features, the crib just sells itself.

Even if Mr. Kissell had nothing else to show but the chicken house—one could almost call it a "chicken hotel"—he would still be well within the realm of good salesmanship through showmanship. His "hotel" is a three-storied structure, furnace heated, running water for convenient flushing or wash-downs. Stairs are provided from floor to floor. The building is 25- x 62-ft. and designed to hold 1,500 hens.

(Continued on page 88)



Above: Concrete barn with attached square silo with the milk house to the left. Below: An apartment type of chicken house

Making Light Weight Acoustic Block

Haydite Products Co. manufactures all standard masonry sizes, including several specialties

WAR DEMANDS have absorbed practically the entire plant capacity of Haydite Products Co., at McNear Point near San Rafael, Calif. Stocks of concrete masonry units in all standard sizes are maintained, but production has been mainly concentrated on large quantities of so-called acoustic block for wind tunnels at airports for testing engines and airplane designs. The comparatively porous texture of the block made with Haydite aggregate has been found to be particularly satisfactory as a sound-absorbent surface.

The plant is operated and owned by G. F. Steigerwalt, who for many years was connected with the Chicago and San Francisco offices of the Portland Cement Association and is widely known among concrete products manufacturers.

Selection of the site was dictated by the fact that it was within very close reach of a plant where Haydite, the lightweight aggregate, is manufactured, and use was made of discontinued clay brick plant storage sheds for curing and storage of concrete products under cover. A very extensive narrow gauge trackage system to all the sheds provided a very convenient and large handling capacity for units. Large trucks, hauling from 16 to 20 tons, make carload deliveries to Bay area cities and to docks in San Francisco. Local deliveries are made by small truck.

Two sizes of Haydite aggregate are used, minus 3/16-in. fines and a 3/16- to $\frac{3}{8}$ -in. size. Aggregates received by truck from the nearby Haydite plant are dumped into a hopper feeding the boot of a bucket elevator, 30-ft. centers, from which it is chuted into a two-compartment bin holding the two sizes of aggregate. Aggregates are fed to the 18-cu. ft. Stearns mixer on the ground floor by means of spouts into measuring boxes. An elevating skip moves the mixed concrete into the hopper feeding the No. 7 Stearns Jolcrete machine having a capacity of about 3200 standard 8- x 8- x

By RALPH S. TORGERSON

16-in. units or equivalent in an 8-hr. day. Normally about six men are employed for regular plant operation, and additional crews for packing acoustic block as needed.

Steam vapor curing capacity in the curing rooms constructed of concrete block is about 2500 standard size or equivalent units, but about 4000 block may be cured in a 24-hour

day. About 40,000 concrete block can be stored under cover in the former brick company sheds.

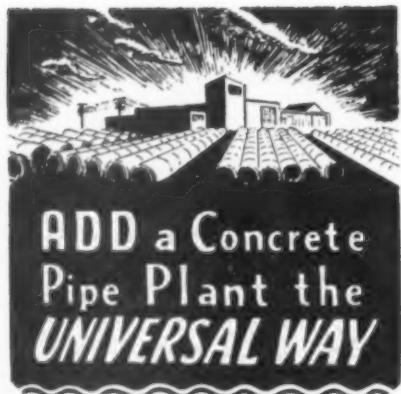
Acoustic block are standard three-cavity 4- x 8- x 16-in. Haydite concrete block with certain controls for the mix and water ratio to provide the right surface texture and strength requirements. After they have been properly cured, the cavities of the acoustic block are filled with rock wool to increase the sound insulation. The amount of rock wool is weighed out on a scale. This work



Dumping lightweight aggregate into hopper for elevation into bins by bucket elevator.
Concrete products plant utilizes facilities of abandoned brick plant



Vibrating type block machine making lightweight acoustic block



ADD a Concrete Pipe Plant the UNIVERSAL WAY

Make Both Large and Small Pipe Profitably

UNIVERSAL not only offers an "all-purpose" machine to produce every size of concrete pipe from 6" to 48" but also equipment for larger sizes such as the 135" pipe we have furnished for highway work.

You are assured of getting superior equipment to produce the finest pipe at a profit from UNIVERSAL.

Write today for catalog and details.

UNIVERSAL CONCRETE PIPE CO., Inc.
COLUMBUS, OHIO



"ANCHOR"

Complete
EQUIPMENT AND
ENGINEERING SERVICE

Equipment for all phases of manufacturing concrete cinder block and other lightweight aggregate units. Our engineering service for new plants and modernizing old ones will help you operate more economically.

Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers, Stearns Jolcrete, Stearns mixers, pallets, Straublox Oscillating attachments, etc.

Repair parts for Anchor, Ideal, Universal, Stearns, Blystone mixers and others.

Anchor Concrete Mch. Co.
G. M. Friel, Mgr. COLUMBUS, OHIO

is largely done by women who find after experience that they can very closely approximate the necessary amount of rock wool in one grab. Many carloads of this kind of block have been shipped.

In addition to various standard sizes of lightweight concrete block, bull nose and jamb block are made and a special bond beam block is made to conform with California requirements. This bond beam block is used around window openings and at the floor line to prevent breakage in settlement and from earthquake shock, and is made with recessed webs to receive horizontal bars of $\frac{3}{8}$ -in. steel, and vertical steel reinforcement is placed in core spaces which are filled with concrete. Concrete cribbing, sills, joists, corner coping and straight coping are other products made.

A concrete burial box is one of the specialties made. This box is not a burial vault, but is merely a box with a base support, ends, sides and cover. The purpose is to provide a supporting structure to prevent earth settlement. Many cemeteries are now requiring a concrete vault or support of this kind. Other specialty products are being developed in cooperation with oil refineries.

Sell Farm Market

(Continued from page 86)

His barn, which is 36- x 48-ft., has a flat, stepped roof of concrete slab construction with a pour of concrete placed over the beams and slabs. The barn has 8-in. thick foundations and 6-in. walls. It is one of the warmest and most convenient structures of its kind, say neighboring farmers. Water pipes in the barn did not even freeze during the recent 10 below zero spell.

The building is 22-ft. high at the lowest step and 40-ft. high at the highest. Ample loft storage space is provided. The two ends of the barn have 8-in. block (6-in. high) placed on edge in a certain design. These openings give good ventilation and add to the appearance of the structure. The silo is connected to the barn by a concrete block feeding entry.

All the structures on the farm, including the barn, are fireproof, and Mr. Kissell can show actual cost figures that are lower than most contractors think possible. When builders see the structures and his cost figures, they start scratching their heads and wonder why these facts had not been known to them sooner. Salesmanship is the answer. In the foreground of the illustration of the

barn is the milk house, made entirely of concrete block.

Last but not least in this design for salesmanship is the home, a seven-room structure, 27- x 37-ft., provided with double walls (two 4-in. walls with a 2-in. air space between) on a 10-in. block foundation.

This attractive home and all the other buildings on the farm were designed and built by Mr. Kissell, president of the company.

Walls and partitions in the home were sprayed with colored cement and the floors were painted. The roof joists and slabs are all concrete products made in his own factory. The 8- x 8-in. lintels up to 14-ft. long are used on the porch. Laid up in ashlar pattern, the concrete block walls have a very attractive appearance. Block in the outside wall in the home are of limestone aggregate and the inside of the lightweight type.

Fireproofness, stability, and permanence, as well as high craftsmanship, are evident. Low-cost construction also should be stressed, for no type of construction in this area can approach his costs. As an example, it required three masons 14 days to complete everything in this modern home, including the full basement under the structure. He plans on considerable decorative art in the yard, including a lily pond similar to the one he has at his Johnstown home, of special marbleized concrete block.

Not all of their sales efforts are confined to the farm. At the plant they have a salesroom, 20- x 35-ft., where they have arranged other special items that they are bringing to the fore—fireplaces, tables, crystal gazing balls, pedestals, bird baths and many other items.

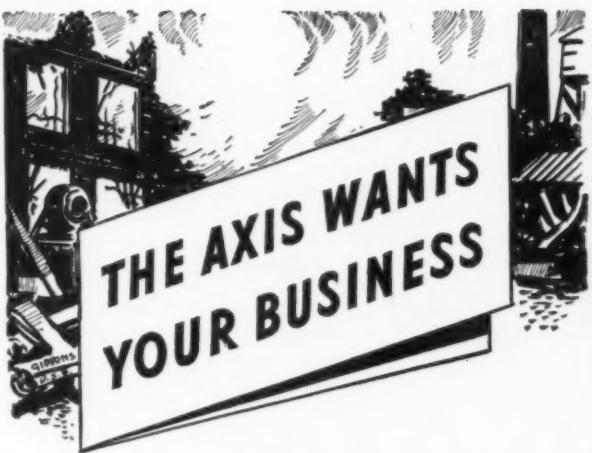
One unique item is a marbleized block that they are now developing. They obtain this special marble-like finish (on one face) without polishing, and in many colors. Panels and counter tops have been made of this newer development. The marbleized block is ideal for bathroom tiling and will only require pointing and a coat of wax to complete the job.

A second room is used for a burial vault display room.

We expect that the Kissell Concrete Block Company's well-planned and all-around sales program will see them through any off-season conditions—come what may.

Minimum Wage Penalties

A MISSOURI crushed stone producer is being sued for \$26,385 by 12 employees, who claim they did not benefit from the federal wage and hour law.



THIS is more than a war of mechanical monsters clashing in the night . . . more than a war of production.

It is a war for markets—*your* markets! The Axis wants your business—wants to destroy it for once and all.

With so much at stake, there is no doubt you will want to do everything you can to meet this Axis threat. Two ways are open: Speed production and BUY BONDS. The only answer to enemy tanks and planes is *more* American tanks and planes—and your regular, month-by-month purchases of Defense Bonds will help supply them. Buy now and *keep buying*.

HOW THE PAY-ROLL SAVINGS PLAN HELPS

When you install the Pay-Roll Savings Plan (approved by organized labor), you not only perform a service for your country but for your *employees*. Simple to install, the Plan provides for regular purchases of Defense Bonds through voluntary pay roll allotments.

Write for details today! Treasury Department, Section R, 709 Twelfth Street, N.W., Washington, D.C.



U. S. SAVINGS

Bonds • Stamps

This space is a contribution to Victory by

ROCK PRODUCTS



CONCRETE...

Concrete hog feeding floor should provide 10 to 16 sq. ft. of space for each hog.

Helps farmers
Aids war industries
Saves transportation



Finishing industrial floor.

On farms, in factories and for war housing much essential construction is needed to speed production for total war. Farmers need feeding floors, dairy barn floors, barnyard pavements, milk houses, milk cooling tanks and many other farm facilities to help increase food production.

Many war industries need paved loading yards, storage areas, concrete floors on grade, platforms, ramps and factory additions.

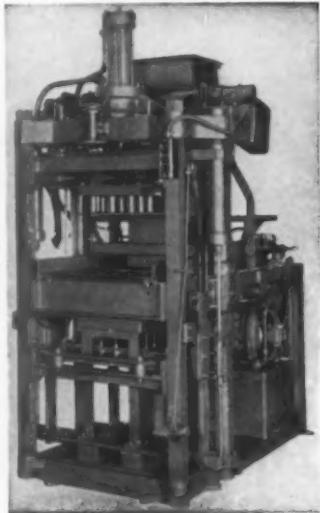
There is urgent need for war housing which requires a minimum of critical material and which can be built quickly.

Concrete contractors and concrete products men can help get these jobs done and at the same time aid the war effort.

PORLAND CEMENT ASSOCIATION
Dept. A4-45, 33 W. Grand Ave., Chicago, Ill.

HELP THE RED CROSS

HYDRAULIC VIBRA-PRESS

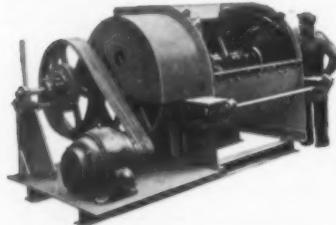


A High Production Machine Making Blocks which are Demanded by the Contractor Endorsed by the Architect Desired by the Mason

The KENT MACHINE CO.
CUYAHOGA FALLS, OHIO

MULTIPLEX

MEANS EFFICIENCY IN PROFIT PRODUCING CONCRETE PLANTS



MULTI-MIXER with reverse screw-type action insures fast and thorough mixing of every batch, on a lower cost basis. Sizes 5 to 60 cu. ft. and larger. Side, bottom or end discharge.



Post War Planning

ROBERT J. COCHRANE, secretary of the Pittsburgh Builders Exchange, has been appointed coordinator on post-war planning of construction, at a meeting of trade executives of the building construction field in the Pittsburgh, Penn., area who have formed an informal association to discuss such subjects as Government regulations and post-war planning. Taking part in this work are such organizations as the Pittsburgh Builders Exchange, Pittsburgh Builders Supply Club, Concrete Block Masonry Association, Pennsylvania Sand and Gravel Association, Ready Mixed Concrete Association, and the Master Builders Employers Association. Mr. Cochrane is to keep the various trade groups informed from time to time on what is being planned in the way of construction, who is doing the planning, and how the planned work is to be financed.

Grant Authority for New Housing Units

ANNOUNCEMENT has come from N.H.A. that the federal government agency has authorized the construction of 3000 new homes in the Chicago metropolitan area in addition

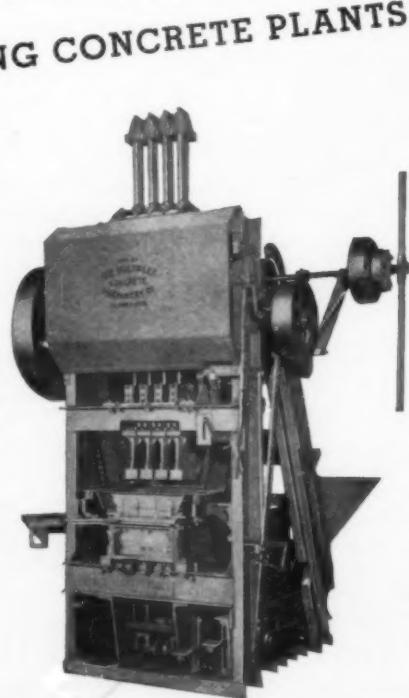
to 2000 remodeled units. W.P.B. priority regulations limit the cost of each home to \$6,000 and the ceiling on remodeling is about \$1000. New homes will be financed by private funds. Builders desiring to participate in the new program may apply for priorities on form PD-105.

To Use Cinder Block

CONSTRUCTION of 100 permanent housing units for Adrian, Mich., has been authorized by the Defense Plants Corporation at a cost of approximately \$300,000. The building contract has been awarded to the Krieghoff Company, and the work is now under way. Concrete (sand and gravel) and cinder block construction will be used for all these units. These units will not have basements, but all of them will be insulated.

Purchase Concrete Pipe Plant

ONTARIO CONCRETE PIPE Co., Ontario, Ore., has been purchased by the Armco Drainage & Metal Products Co., Inc., Denver, Colo. The concrete pipe company's plants in Boise, Caldwell and Twin Falls, Idaho, also were included in the transaction.



There's a MULTIPLEX machine for every concrete products operation, with all types of accessories necessary for modern high-speed mass production.

Here are the two popular profit-makers of the MULTIPLEX line.

SUPER TAMPER — ruggedly constructed. Turns out 4 to 6 units per minute, efficiently and economically. Low cost production with minimum upkeep. New improvements assure better units at greater volume. Runs quietly with little vibration. With position-timed feeding and stripping, its 5-point clutches assure quick action. No waiting between operations—higher unit rate of production at lower unit cost.

Write for booklet describing the MULTIPLEX complete line of mixing equipment, including Double and Single Hand Press Strippers, and Super Tamper.

MULTIPLEX CONCRETE MACHINERY
ELMORE, OHIO

Gypsum in War

GYPSUM PRODUCERS and manufacturers of gypsum products are taking a real part in the war program. Witness:

Self-sealing liners for bullet-proof gasoline tanks now are made over moulds of gypsum.

Raw gypsum is being used in the refining of certain nickel ores and in making lead-copper matte as an aid in removing the valueless parts of the ore.

Precision casting of non-ferrous metal parts is being speeded up by the use of gypsum plaster moulds.

In the building field, gypsum's biggest market, many new products have been developed which are speeding the construction of vital war plants.

Among these are an exterior siding wallboard with weather resistant roofing applied to the outer surface and roof planks made by laminating several thicknesses of gypsum wallboard to form planks up to four inches thick.

Then there is a laminated solid gypsum partition panel which makes possible the rapid erection of fireproof partitions not only without the use of steel but also with a great saving of lumber.

Since steel and lumber are both extremely scarce now, the use of these new gypsum products will make it possible for work to continue on many war products which otherwise might have to be suspended.

Oregon Black Sands

A CONTINUING STEP in the search for strategic and critical minerals by the Department of the Interior is under way by investigation, with the aid of geophysics, of chromite-bearing beach sands in Oregon, the Geological Survey reported.

Surveys along the Oregon beaches, which for the last 75 years have been known to contain large amounts of black sand, have located deposits containing chromite, ilmenite, magnetite, and zircon in sufficient quantities to encourage mining. Investigation by Government agencies and private companies thus far indicate reserves, in coastal terraces representing ancient raised beaches, of 1,400,000 long tons of sand averaging between 5 and 9 percent of chromic oxide and as much as 1 percent of zircon. Present beaches are estimated to contain perhaps 90,000 long tons of sand averaging 5 percent or more of chromic oxide. Geologists believe that extensive but unknown reserves are probably present at other locations in which black sands occur.

A New Dredge Design of Compact Completeness and Strength that makes for Long, Continuous Service

The Flint Sand & Gravel Company, Inc., New Orleans, Louisiana, producers of concrete aggregates, in the fall of 1940, at their Bluff Creek, Louisiana plant, commissioned a new pump dredge, the latest addition to their excavation equipment. It is 10-in. pump size, with 12-in. plain suction line. The hull, 28'-0" by 45'-0" x 4'-0", is all-welded steel construction of three fore-and-aft pontoon sections, with field bolted assembly. The center section is open deck, having main equipment sub-bases framed integrally, forming an engine cockpit. The two side pontoons with flat decks, support auxiliary equipment and contain fuel oil tanks. The "A"-frame and boom are steel. The cabin is timber framed and wood siding.

For production, a 10" Amsco, Type "H-CF", Form 40 Heavy Duty Dredge Pump is used. It is "Counter-flow" water seal construction, right hand, 30 degree upturn discharge. Individually powered, it is directly connected to a diesel engine, 8 cylinders 9" x 12", developing 315 H.P. at 514 R.P.M.

The operator's position is forward. The hoist, straddling the deck level suction line, is electric motor powered.

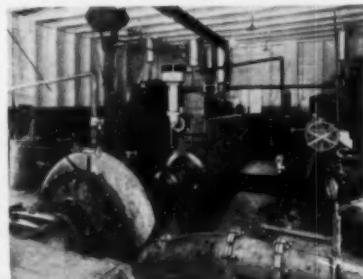
A 40 H.P. auxiliary diesel power unit drives a 20 K.W. generator producing direct current of 250 volts and is directly connected to a 3" size, two-stage, general service centrifugal

water pump. An additional 12 H.P. auxiliary diesel power unit is available for driving a 5 K.W. generator, a water pump for bilge and stand-by fire protection, and the air compressor. Every facility is provided for adequately servicing all power equipment.

The dredge pump water end parts and all hull pipe line fittings are made of Amsco impact and abrasion resistant manganese steel, "The Toughest Steel Known."

The entire undertaking is more than just a fine piece of machinery. It is well planned and built with staunchness that exemplifies "fitness of purpose." It is compact, simple in arrangement, trim in appearance, and judged by performance, in almost continuous day and night service since its commission, it has proved to be most "Dependable and Economical."

A bulletin is available completely describing Amsco Dredge Pumps, Rotary Cutters, and Pipe Line Fittings.



Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois

FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLOR.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

THE AMERICAN
Brake Shoe
AND FOUNDRY COMPANY



Products Exempt from Contract Renegotiation

APPROVAL has been given by the War, Navy, Treasury and Maritime Commission to a joint regulation listing the products which are not subject to contract renegotiations. The following rock products have been exempted: Aggregates consisting of washed or screened sand, gravel, or crushed stone; cement; lime; magnesite; dead burned magnesite; crude gypsum; calcined gypsum; fluorspar ore; fluorspar fluxing gravel; lump ceramic ground fluorspar; acid grades of fluorspar; phosphate rock; superphosphate; bismuth; and rough dimension stone. Contractors who further refine, process or treat products beyond the exempted state in order to perform their contracts or subcontracts are permitted, for the purposes of renegotiation to consider the exempted product as an item of cost at its established sale or market price.

Spending \$600,000 on Quarry

THE SPOKANE-PORTLAND CEMENT CO., Spokane, Wash., will operate the dolomite quarry near Marble, Wash., to provide raw material for a magnesium reduction plant. The quarry



is being prepared and equipped for operation by the Electrometallurgical Co. under the direction of the H. K. Ferguson Co. Improvements will cost about \$600,000. About 750 tons daily will be produced.

Gold from Friant Dam Aggregate

ABOUT \$200,000 in placer gold was recovered from the aggregate washed for concrete placed in the Friant Dam in California. Net gain, after deducting for plant recovery equipment, was \$176,000 which was divided evenly between the contractors, Griffith Co. and Bent Co., and the

Bureau of Reclamation. Placer gold also is being extracted from Shasta Dam aggregate.

Potash Allocation

UNDER W.P.B. ORDER M-291, consumers of potash must obtain authorization to accept delivery on form PD-600. After consumers obtain approval and file orders within the amounts authorized suppliers must obtain authorization to ship potash on form PD-601.

Seeks to Haul Concrete

LAKEVIEW SAND AND GRAVEL CO., Fond du Lac, Wis., has applied for an amendment of its contract motor carrier license to permit hauling ready mixed concrete.

Fire Loss

BRIDGETON SAND CO., New Freedom, N. J., reported a fire in its drying plant had resulted in a loss of about \$25,000, principally to conveyors and elevators.

Safety Award for Medusa

MEDUSA PORTLAND CEMENT CO., Cleveland, Ohio, was awarded the Liberty magazine "Liberty Bell" for outstanding accident prevention work among industrial plants.

CHAINS	FEEDERS	PULVERIZERS	SHREDDERS
CONVEYORS	GRINDERS	PULLEYS	SPROCKETS
CAR PULLERS	IDLERS (Belt)	MONO-VEYORS	TAKE-UPS
CRUSHERS	GEARS	SCREENS	WAYTROLs
ELEVATORS	PORTABLES	TRANSMISSION MACHINERY	

Jeffrey equipment and plant engineering cover the entire stone products industry . . . sand and gravel, crushed stone and cement. Equipment provides long service and maximum economy. Our rich experience is at your disposal.

THE JEFFREY MANUFACTURING COMPANY

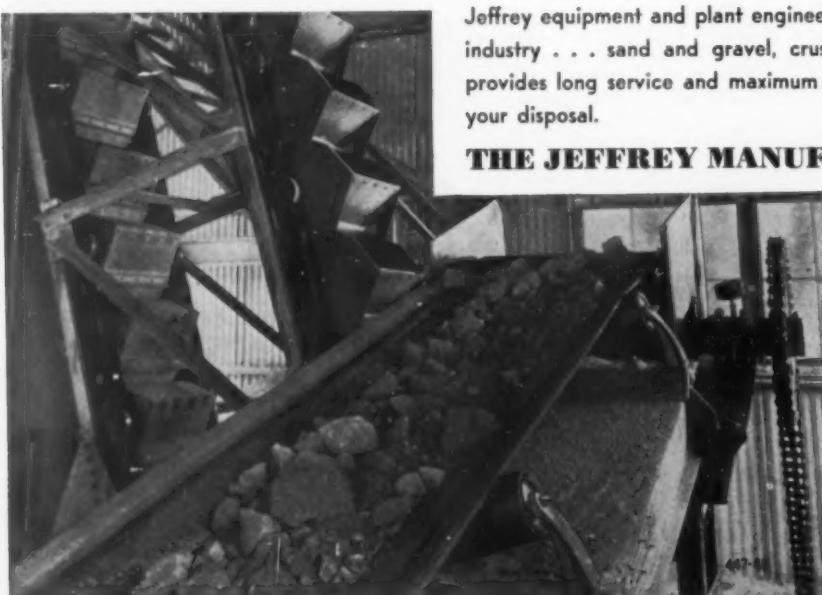
935-99 North Fourth Street

COLUMBUS, OHIO

Baltimore Cleveland Pittsburgh
Birmingham Denver New York
Boston Detroit Scranton
Baltimore Hartford Salt Lake City
Chicago Huntington St. Louis
Cincinnati Houston Milwaukee



Jeffrey bucket elevator (heavy duty type) and belt conveyor are shown at left. They are handling crushed stone in a large quarry operation. Jeffrey units will speed up schedules—will soon pay for themselves.



Going Out of Business

VULCANITE PORTLAND CEMENT CO., Philadelphia, Penn., has announced that the company is retiring from the cement business, and is now in process of liquidating its assets. The plant, located near Phillipsburg, N.J., has not been used since 1932. Equipment has been sold to the Heat & Power Co., Inc., New York, N.Y., and includes power plants, kilns, boilers, blowers, crushers, mills, machine tools, steel rail and other items.

Cement Plant Halts Production

LEHIGH PORTLAND CEMENT CO. has shut down production at its Mitchell, Ind., plant with bins full. When plant production is resumed in 1943, it is expected that operations will be on a reduced capacity basis.

Behind on Agstone Orders

COUNTY A.A.A. authorities with headquarters at Carthage, Mo., reported they had discontinued taking orders for agricultural limestone until the stone crushing plants could catch up with orders. Early in March the office reported orders for 9000 tons not yet delivered.

Low Bidder on Agstone

THE LIMESTONE PRODUCTS CO., Fertile, Iowa, was low bidder on agricultural limestone to be delivered and spread on farms in Hancock county in connection with the 1943 A.A.A. program. The price per ton ranges from \$2.60 to \$3.20, depending on the distance from the quarry.

Open Wisconsin Quarry

GENERAL REFRACTORIES CO., Ableman, Wis., has reopened one of its quarries after a shutdown of several years. At one time this city was the center of extensive quarry operations.

Correction

ON PAGE 112 of the March, 1943, issue of ROCK PRODUCTS, a news item was published with heading, "W.P.B. Cement Industry Advisory Committee." This item should have been headed, "W.P.B. Cement Industry Transportation Advisory Committee."

Substitute Welding Rod

A. D. WILLIS of the A. D. Willis Sand & Gravel Co., Poplar Bluff, Mo., offers the following suggestion for those who find it difficult to obtain welding rod. He advises that automobile brake rods make good substitute acetylene welding rod on ordinary heavy steel welding jobs. It is,

of course, understood that the use of automobile brake rods for this purpose is only to be resorted to if welding rod is not obtainable.

Housewives Learn to Pick Mica

GRANITE STATE MINING CO., Wentworth, N.H., has opened one mica mine and is developing a second. The company established a household industry so that women who learn the trade may prepare the product in their own homes for use in war machines. The company has bought the place known as "Bridge Inn," in the

village, and is using part of the house as a shop and storage vault for mica.

Change Name

ECK BROS. is the new name of J. A. Eck & Sons, Inc., sand and gravel producers, Montoursville, Penn. Walter A. Eck, formerly secretary and manager; J. Otto Eck, formerly treasurer; and Frank E. Eck, vice-president, sold their stock, effective February 1, 1943.

Fire Losses

WHITE SAND & GRAVEL CO., Val Verda, plant near Bountiful, Utah, was damaged by fire recently.

AKINS

Classifiers



This 54" High Weir Type AKINS Classifier is equipped with wash boxes and lifter blades for washing sand.

For Close Separation to Any Specification in SAND WASHING

The AKINS Classifier does not stall when stopped—requires no unloading to start after shutdown, a big advantage if you operate less than 24 hours. These classifiers are capable of close separations to any specification. Easily capable of big tonnages with low power cost. No complicated mechanisms. State your sand washing problem when writing.

★ Ask for Bulletin 24-HA

We Also Manufacture

LOWDEN Dryers

Skinner Multiple Hearth Roasters

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Smelting Equipment

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COLORADO IRON WORKS CO.

Main Office, DENVER, COLORADO, U.S.A.

Canadian Locomotive Co., Ltd., Kingston, Ont., Can. Clyde Engineering Co., Ltd., Granville, N.S.W., Head, Wrightson & Co., (So. Africa) Ltd., Johannesburg.
Vancouver Iron Works, Ltd., Vancouver, B.C., Can. Head, Wrightson & Co., Stockton on Tees, Eng.

Canada's Cost of Living Is Actually Falling

By KENNETH R. WILSON

Ottawa Correspondent of Rock Products

PRICE CONTROL authorities both at Washington and Ottawa are pessimistic about the prospect of maintaining price-wage control at their present levels. It is of course openly admitted in Washington that the very best that can be hoped for in the U. S. is to keep prices within $\frac{1}{2}$ percent per month of present levels, and that the passage of the Bank-

head and the Pace Bills, or the granting of a \$2 wage increase as demanded by John Lewis, would be fatal to present U. S. controls.

For the moment Canada's price control machinery is in the embarrassing position of having to worry about too great a drop in the cost of living. Because Canada subsidized certain consumer goods (oranges, tea,

milk and coffee) in order to remove pressure on the price ceiling, the index has been momentarily declining rather than increasing. If it goes down much further it means that Canadian wage-earners will have to forfeit part of the cost-of-living wage bonus—an event which would be highly embarrassing (politically) to the government when labor is generally restive against the ceiling on "basic" wage rates. Strong dislike at Washington for trade or consumer subsidies makes such an occurrence in the U. S. an impossibility.

Apart from this unusual circumstance there is an overhanging fear at Ottawa against Canada's ability to hold her present price and wage ceiling policy in light of the virtual certainty of continued rise in prices and wages in the U. S.

Sand and Gravel

V. P. AHEARN has informed the members of the National Sand and Gravel Association and the National Industrial Sand Association in regard to the application of the 3 percent transportation tax as follows:

Intra-Plant Transportation Tax

The Bureau of Internal Revenue regards the tax as payable in two cases: Amounts paid to truckers for hauling unprocessed materials from the point of extraction to the point of initial processing; and, with respect to the truck transportation of overburden or topsoil, if the owner of the deposit designates the place to which the overburden or topsoil is to be removed. If the trucker is free to dispose of the overburden or topsoil as he sees fit, the tax is not applicable.

Thus the affected industries are left with no alternative, so far as the present policy of the Bureau is concerned, but to pay the tax under the facts cited. It should be emphasized again that "If the relationship of employer and employee exists, for Federal employment tax purposes * * *," the amounts paid to the truck drivers by their employers are not subject to the tax.

The Association should be advised if member companies desire to contest the ruling of the Bureau. This could be done by the selection of a typical case, with the producer, acting under the advice of Association counsel, refusing to pay the tax and then having the Bureau assess it, whereupon the tax could be paid under protest and the issue gotten back before the Bureau. If a sufficient number of member companies

Use Genuine WILFLEY TABLES for WET GRAVITY CONCENTRATION TO SAVE NON-METALLIC MINERALS



Which One OF THESE FOUR USES FITS YOUR NEED?



MASSCO JUNIOR
Rock Bit Grinder

For the use of a limited number of bits—either detachable or conventional steel. Sold as shown, or fixtures only for face and gauge grinding with independent bases—usable with any grinder (bit holder included).



DENVER
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The
Mine & Smelter
Supply Co.

CANADIAN
VICKERS, LTD.
MONTREAL
W. R. JUDSON
SANTIAGO, LIMA

indicate an interest in this procedure, a program will be laid before the Board of Directors for consideration.

Expand Mica Mining

MARVIN BOWDEN, Juliette, N. C., owner of mica mining rights in Monroe county near Forsyth, N. C., has announced that mining operations have been started.

SHELBY MICA CO., Shelby, N. C., is the name of a new company which has been organized to engage in mica mining under the sponsorship of the Colonial Mica Corporation, the federal government agency.

COOPER MICA CO., Asheville, N. C., has been chartered for the purpose of reopening a mica mine on the Toy Webb property near Shelby. John M. Cooper and A. D. Dolliver, Asheville, N. C., and Bill Atkins of Burnsville are the incorporators.

Lease Sand-Limestone Land

SAND AND STONE PROPERTIES of Western Maryland, Inc., has leased to Cumberland Cement and Supply Co., Cumberland, Md., sand and gravel and limestone deposits for a period of 15 years. Royalties are fixed at 6c per ton for limestone and 10c per ton for all lime made with a minimum of \$500 a year; 7c per ton for sand with a graduated scale for all over 50,000 tons, which brings the rate down to 3c per ton for all over 80,000 tons and 6c per ton for sand stone and building stone with a minimum of \$1000 per year. The lease was signed by W. P. Sherman, president of the sand company, and George K. Steiner, president of the Cumberland Cement and Supply Co.

Temporary Pipe Plant for Large Water Job

LOCK JOINT PIPE CO., Ampere, N. J., is building a temporary plant near Wilmington, N. C., to manufacture reinforced concrete pipe for a nine-mile salt-free water supply line for which Federal funds have been allocated. Equipment and machinery will be moved from the plant at Huntsville, Ala.

Pavement Yardage

Awards of concrete pavement for February, 1943, have been announced by the Portland Cement Association as follows:

Square Yards Awarded During February, 1943	
Roads	541,153
Streets and Alleys	630,858
Airports	5,065,170
Total	6,237,181

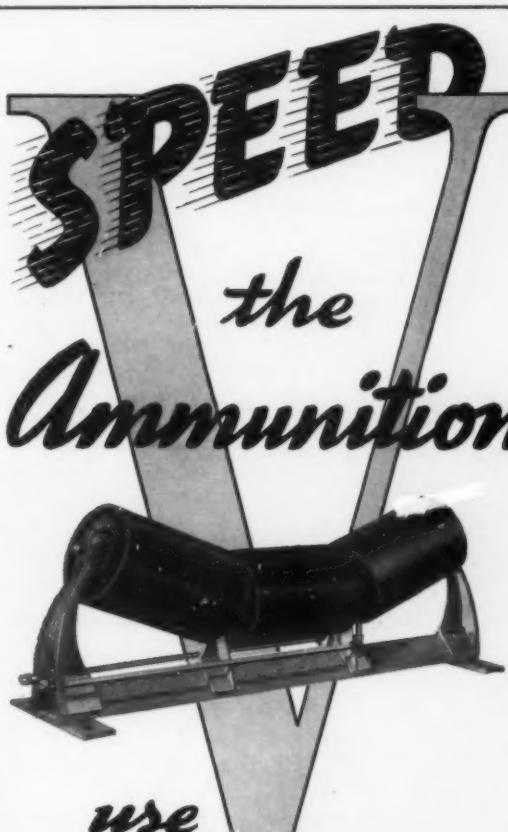


WEIGH WHILE YOU CONVEY
with a
Weightometer

Automatic	Yes ✓
Time Saving	Yes ✓
Accurate	Yes ✓
Reliable	Yes ✓
Durable	Yes ✓
Easy Maintenance	Yes ✓

Used in plants all over the world. Many in service for over 30 years.

Send for Bulletin No. 375.
MERRICK SCALE MFG. CO.
 188 AUTUMN ST. PASSAIC, N. J.



SPEED
the
Ammunition

use

CONTINENTAL Belt Conveyor Idlers

SPEED is the order of the day. And there's no better way to speed up your production than by installing Continental Belt Conveyors. Many vital war plants have chosen Continental Belt Conveyors to speed their bulk materials. They are designed to do the job efficiently at a low cost per ton. They have what it takes!

You, too, can *Speed the Ammunition* by using Continental Belt Conveyors. Write today for information and Bulletin ID-103, which shows the superior features of Continental Belt Conveyor Idlers.

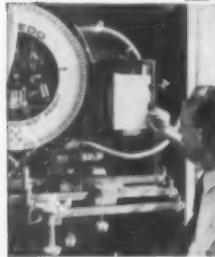
INDUSTRIAL DIVISION
Continental GIN COMPANY * * *
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IMPROVES QUALITY
REDUCES COST

Moisture Meter

The only unit capable of determining moisture content in ONE minute.



Compensator

Delivers correct DRY weight of aggregates and ADDED water. Makes a graph record of EVERY BATCH.

SC² CONTROL produces remarkable uniformity. Is always approved by concrete engineers. Has definite sales value. Write for our booklet "PROFITS IN CONCRETE."

SCIENTIFIC CONCRETE SERVICE CORP.
McLachlen Bldg., Washington, D. C.

Midwest Gravel Men Meet in Chicago

IN RESPONSE to an invitation sent out by R. E. Weaver, president, Illinois Sand and Gravel Association, a representative group of producers from the states of Illinois, Indiana, Missouri, Iowa and Wisconsin met in Chicago, March 18, to hear the latest news about government rules and regulations as they affect this business. The guest of honor and the only speaker was Vince P. Ahearn, executive secretary, National Sand and Gravel Association, Washington, D. C.

Mr. Ahearn spoke for over four hours on a stretch and answered many questions. He explained the use of PD-731 form for application for priority on new equipment, and PD-400 C application forms for quarterly quotas for the mining industry. Production records for each mine (sand and gravel operation) must be furnished, and if a plant is not producing its serial number will now be withdrawn. Hence it is not possible to consolidate the quotas of several plants, operated by the same organization. It is desirable, where a shut down is in prospect, to get the plant

in the best shape possible, if early resumption of operation is in prospect.

W.P.B. and P-56

He explained how the Mining Division of W.P.B. is integrating its operation into the C.M.P. (Controlled Materials Plan). The Mining Division will now act for the entire mining industry exactly as the Army, Navy, Shipping Board and other claimant agencies act for their interests. It will estimate the quarterly requirements of the mining industry and attempt to get a consolidated quota for the industry. If the Mining Division is not allowed the quota requested, but a reduced quota, it will have to cut back all the individual quotas as best it can.

For the second quarter of 1943, beginning April 1, the mining industry quota for the first time is broken down into (1) metals; (2) prefabricated repair parts; (3) supplies. The operator must be careful to get his requirements in the right classification. The lists of each may be obtained from any local W.P.B. office. (1) Metals include some things that might be considered by the uninitiated as "fabricated." One can not anticipate priority ratings in his purchases until his quota is actually allowed.

Beginning with the second quarter all ratings for quota materials or equipment that are allowed will bear an AA-2X rating. If delivery of material or equipment under a previous quota allowance has not been made prior to April 1, and it did not carry a AA-2X rating or better, it may be diverted by the manufacturer after April 1 to some other purchaser whose rating is AA-2X. In other words anything with lower rating may not be obtainable even if on order.

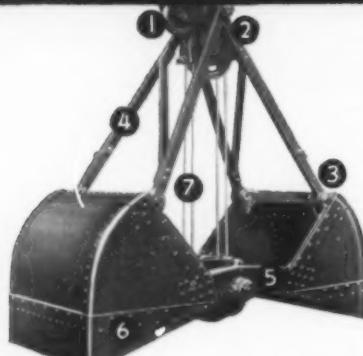
Mr. Ahearn cautioned operators not to charge against their quotas anything that can be purchased outside of the materials and equipment on the quota list. For example motor truck repair parts are not included in quota requests. Coal purchases do not require quota assignments.

The quota requests will carry allotment numbers along with the priority rating, and these orders with allotment numbers will precede all priority orders without allotment numbers.

In spite of the increasing difficulties in getting repair and maintenance parts and supplies, Mr. Ahearn

SEVEN FACTS

IT WILL PAY YOU TO KNOW ABOUT BROWNHOIST BUCKETS



- ① 5 to 22% longer sheaves lengthen rope life.
- ② Underslung top block lowers center of gravity.
- ③ Extra large cover-bracket-bearings easily lubricated.
- ④ Well-braced, forged Bail Bars give extra strength.
- ⑤ Annealed cast steel closing arms increase digging efficiency.
- ⑥ Heavy carbon-steel sharpened digging lips (with or without teeth) provide efficient digging.
- ⑦ Cables last longer by being kept from contact with material.

Write today for complete catalog of Brownhoist rope reeve, power wheel, special purpose, open type grab, link-type buckets.

INDUSTRIAL BROWNHOIST

BAY CITY, MICH. • DISTRICT OFFICES: NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, CHICAGO.

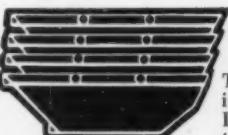
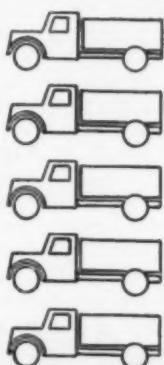
said the difficulties in keeping and getting manpower to operate would be much greater. This led to a general discussion of the possibility of using more women about the plants. It was developed that women are being used by several operators as scale tenders, time keepers, picking out clay on picker belts, and in at least one instance, operating a truck loading machine.

There was some question as to whether there is such a shortage of labor in the midwest country districts as is alleged. One or two operators said they had more applications for work this season than they could fill.

Open-Top Car Situation

Another subject for general discussion was the open-top car supply for this season. According to Mr. Ahearn, there is a shortage in prospect; but the railways' managements were fully alive to the situation and doing their best. The matter of the condition of the cars supplied to the shippers for loading came in for considerable discussion. The cars appear to be in worse condition than heretofore, and instead of \$1.50 or \$2 formerly allowed for patching them and stuffing the cracks and holes with burlap, it probably costs, according to one operator, nearer \$8

How many Trucks equal ONE Brooks LOAD LUGGER!



One - piece, welded buckets. Can be nested for hauling empty on hurry-up jobs.



That depends on the job . . . number of men loading . . . length of haul . . . kind of material handled. In general, one LOAD LUGGER with 5 to 10 detachable dump-buckets is equivalent to an equal number of ordinary trucks in daily payload capacity. That is why you can save time, gas, tires and manpower when you use LOAD LUGGERS for moving materials, loaded by hand. Write for Catalog No. 44.

804 Davenport Road, KNOXVILLE, TENNESSEE

Distributors in All Principal Cities

Brooks EQUIPMENT AND MFG. CO.

Why Hendrick Perforated Plate Gives You BETTER SCREENING



If you are looking for better, lower-cost screening, you can get it with Hendrick Perforated Plate because the mesh remains uniform for the life of the screen and the full clearance prevents clogging. Single or double corrugated, the irregular surface makes little peaks and valleys that tumble and sift the particles and keep the material from sliding off the plate too quickly. Any size or shape of perforation, in any thickness. Write for complete details.

HENDRICK MANUFACTURING CO.

47 Dundaff St., Carbondale, Pa.

SALES OFFICES IN PRINCIPAL CITIES

PLEASE CONSULT TELEPHONE DIRECTORY

Makers of Elevator Buckets of all types. Mitco Open Steel Flooring. Mitco Shur-Site Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction.

APRIL, 1943



LOW-COST ACCURATE SCREENING

Link-Belt "Up" vibrating screen separating silica sand.

- Screening equipment is of first importance to National Pulverizing Co., Millville, N. J., whose product—silica sand—is accurately graded to seven sizes. Starting 15 years ago with 8 Link-Belt vibrating screens, they have since purchased 7 additional units. As in numerous other installations, Link-Belt vibrating screens have shown the way to accurate separation and lowest operating cost. The whole story of their economy and smooth, trouble-free operation is given in Book No. 1762. Send for a copy today.

LINK-BELT COMPANY 8894
2045 W. Hunting Park, Philadelphia

WRITE TODAY!

LINK-BELT
Vibrating Screens

per car. No burlap is available and old roofing paper, cardboard and any old rags are used.

Mr. Ahearn also discussed the 48-hour day order, price ceilings, the 3 percent transportation tax, etc.

Registration

The following producers were present: H. D. Bellamy, Concrete Material & Construction Co., Cedar Rapids, Ia.; E. W. Boynton, Northern Gravel Co., Muscatine, Ia.; H. P. Caldwell, Ohio River Sand Co., Louisville, Ky.; H. A. Clark, Consumers

Co., Chicago, Ill.; Otto S. Conrades, St Louis Material & Supply Co., St Louis, Mo.; I. M. Clicquennoi, Waukesha Washed Sand & Gravel Co., Milwaukee, Wis.; C. C. Deal, Deal Gravel Co., Elkhart, Ind.; O. J. Ellingen, H. D. Conkey & Co., Mendota, Ill.; George R. Emanuelson, Anderson Sand & Gravel Co., Rockford, Ill.; C. E. Graebner, Northern Gravel Co., Muscatine, Ia.; Norman R. Halliday, Halliday Sand Co., Cairo, Ill.; V. O. Johnston, Lincoln Sand & Gravel Co., Lincoln, Ill.; H. J. Larkin, Rock Island Sand & Gravel Co., Rock

Island, Ill.; Frank Larson, Larson Bros. Sand & Gravel, Rockford, Ill.; F. W. Longan, Lincoln Sand & Gravel Co., Lincoln, Ill.; C. L. Luker, McGrath Sand & Gravel Co., Lincoln, Ill.; T. E. McGrath, McGrath Sand & Gravel Co., Lincoln, Ill.; B. E. Neal, Neal Gravel Co., Mattoon, Ill.; Kenneth Shaw, Mt. Carmel Sand & Gravel Co., Mt. Carmel, Ill.; Glenn Sitterly, Western Sand & Gravel Co., Spring Valley, Ill.; R. E. Weaver, Lincoln Sand & Gravel Co., Lincoln, Ill.; W. H. Wyckoff, Merom Gravel Co., Decatur, Ill.

Built in many sizes

Heavy Duty HiCarbon cast steel Roller Bearing JAW CRUSHER

Cross Section View of Heavy Duty HAMMER CRUSHERS from 1 ton per hour to 500 tons per hour capacity.

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OUR TRADITION IS YOUR SECURITY
GRUENDLER CRUSHER & PULVERIZER CO.
PLANT and MAIN OFFICE — 2915-17 N. MARKET • ST. LOUIS, MO.

NEW HAVEN VIBRATOR CO.
145 CHESTNUT ST. NEW HAVEN, CONN.

FINANCIAL NOTES

RECENT DIVIDENDS

Arundel Corp.	.25	Apr. 1
Calaveras Cement Co.	7% pfd. (p100) (arrears)	.75 Mar. 15
Consolidated Cement Corp.		
\$1.40 cl. A. (np) (arrears)	.35	Mar. 12
Dolese & Shepard Co.	1.00	Apr. 1
Ideal Cement Co.	.35	Mar. 31
Industrial Silica Corp.		
6½% pfd. (p100) (arrears)	1.62½	Mar. 10
Kelley Island Lime & Transport Co.	.20	Mar. 31
Lehigh Portland Cement Co.	.37½	May 1
Longhorn Portland Cement Co. Com. (np)	.25	Mar. 15
Pacific Coast Aggregates, Inc., Com. (p10)	.03	Mar. 20
Santa Cruz Portland Cement Co.	.25	Apr. 1
Superior Portland Cement Co. A.	.82½	Apr. 1
United States Gypsum Co.	.50	Apr. 1
United States Gypsum Co. 7% pfd.	1.75	Apr. 1
Yosemite Portland Cement Corp. pfd.	.10	Apr. 1

KELLEY ISLAND LIME & TRANSPORT Co., Cleveland, Ohio, had a net profit of \$291,322 for the year ended December 31, 1942, as against \$315,046 for a like period in 1941. Net sales for 1941, as reported by S.E.C., were \$4,566,670, but no report on 1942 sales is available.

BASIC REFRACTORIES, INC., Cleveland, Ohio, had a consolidated net profit of \$670,293 for the year ended December 31, 1942, as against \$450,592 for a like period in 1941. Net sales in 1941 were \$4,493,126, from S.E.C. reports; 1942 reports not available.

RIVERSIDE CEMENT CO., Los Angeles, Calif., reported a net income of \$403,338 for the year ended December 31, 1942, as against \$747,313 in 1941. Expenditures of over \$200,000 were made to rehabilitate the Oro Grande plant for cement manufacture.

ALPHA PORTLAND CEMENT CO., Easton, Penn., presented the following income account for the years ended December 31:

	1942	1941
Net sales	\$10,814,711	\$9,976,600
Operating expenses	6,645,780	6,108,064
Maint. & repairs	1,159,738	980,357
Deprec. & deplet.	978,972	985,290
Operating profit	2,030,222	1,902,889
Other income	77,016	56,340
Total income	2,107,238	1,958,229
Income charges	32,870	30,613
Fed. income tax	822,511	602,944
War conting. res.	200,000
Net income	1,051,857	1,325,673
Common divs.	951,135	1,269,258
Surplus for year	100,722	56,415
Surplus, Jan. 1...	3,423,018	3,336,603
Surplus, Dec. 31...	3,523,740	3,423,018

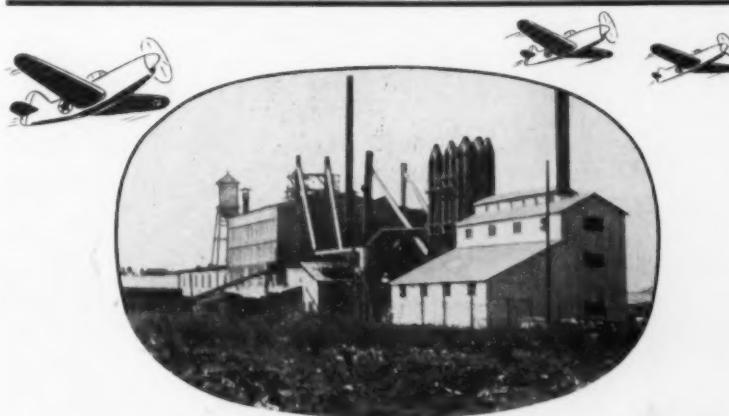
* No liability incurred for excess profits taxes.

SOUTHERN PHOSPHATE CORPORATION, New York, N. Y., had a net income of \$100,287 for the year ended December 31, 1942, as compared with \$192,331 in 1941.

INDUSTRIAL SILICA CORP., Youngstown, Ohio, reported a net income of \$215,754 for the year ended December 31, 1942. In 1941, the net income was \$227,303. Operating profit was

much higher in 1942, but the higher taxes cut down the net income as compared with 1941.

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., had the best year in its history in 1942 with an increase of 80 percent in sales. After all charges, the net income in 1942 was \$545,380. This compares with a net of \$286,849 in 1941. The company



Norblo War Plant Experience Will Profit the Cement Industry

During a quarter century of working with the cement industry, Norblo engineers have had presented to them and have solved some of the toughest problems that can arise in dust collection.

The compulsion to seek basic solutions by going back to first principles, the realization that "Nature makes the rules for dust collection" resulted in Norblo design which in other industries, notably smelting, has shown almost spectacular efficiencies as compared to previous work in those fields.

In turn, Norblo experience in war industries has revealed new angles which can revise and greatly improve dust collection in cement and rock products plants.

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Norblo
DUST COLLECTION
THE NORTHERN BLOWER COMPANY
6409 BARBERTON AVENUE • CLEVELAND, OHIO

paid \$207,507 in dividends during 1942 and expended \$62,324 for the purchase of its own shares in the open market. Sales totaled \$6,103,075 in 1942, a gain of \$2,708,662 over 1941.

CONSUMERS CO., Chicago, Ill., has reported consolidated net profits of \$364,555 for the year ended December 31, 1942, as compared with \$282,799, despite \$175,444 in chargeoffs for losses in 1942 from the disposal of non-operating assets, and provision of a \$300,000 reserve for con-

tinent federal income taxes. Net sales in 1942, according to President Robert C. Fenner, totaled \$17,855,000, an increase of 11 percent over 1941. Building material sales increased 13 percent.

MONOLITH PORTLAND CEMENT CO., Los Angeles, Calif., showed a net profit of \$189,716 for the year ended December 31, 1942, after all charges. This compares with a net profit of \$235,022 for a similar period in 1941.

MISSOURI PORTLAND CEMENT CO., St. Louis, Mo., presented the following

income account for the years ended December 31:

	1942	1941
Net sales	\$5,828,522	\$5,155,540
Cost of sales.....	3,825,883	3,190,134
Selling, etc. exp..	591,258	635,445
Other deducts., net	55,881	11,528
Deprec. & deplet..	462,684	398,949
Operating profit ..	892,817	919,484
Income taxes	358,664	296,211
Net income	534,153	623,273
Dividends	353,008	423,609
Surplus for year...	181,145	199,664
After deducting \$350,575 U. S. tax notes.		

LONGHORN PORTLAND CEMENT CO., San Antonio, Texas reported a net income of \$524,990 for the year ended December 31, 1942, after all charges. This compares with \$674,217 for a like period in 1941.

SUPERIOR PORTLAND CEMENT CO., Seattle, Wash., had a net income of \$476,631 for year ended December 31, 1942, as against \$527,261 for a like period in 1941.

NATIONAL GYPSUM CO. has reported the following consolidated income account for the years ended December 31:

	1942	1941
Net sales	\$22,139,798	\$24,258,348
Cost of sales....	16,543,959	16,515,548
Balance	5,595,840	7,742,800
Contract fees ..	140,700	
Gross profit ...	5,736,540	7,742,800
Deprec. & deplet..	706,232	
Selling, etc. exp.	2,965,427	3,225,889
Doubt. accts. etc.	21,915	171,481
Operating profit ..	2,749,198	3,639,197
Other income ...	222,098	140,412
Total income ...	2,971,296	3,779,609
Interest, etc.	216,086	195,539
Prov. for litig.	85,656	43,462
Other deductions	100,000	27,978
War contract res.	623,000	650,000
Fed. income taxes	980,000	1,215,000
Excess prof. tax.	cr 44,000	-----
Post-war tax cred.	cr 54,000	-----
Debt retire. cred.	cr 24,736	87,217
Other income tax	cr 8,242	26,597
Pr. yr. inc. tax..	1,048,059	1,533,816

¹ Depreciation, depletion and amortization not stated separately, amounted to \$946,601.

² Under cost-plus-fixed-fee contract.

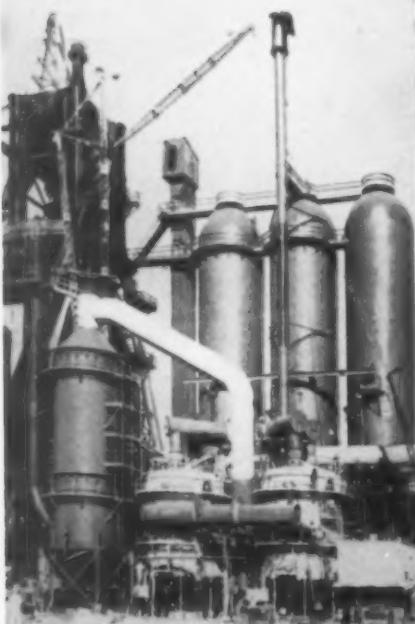
³ Includes \$134,245 profit on disposal of plant and non-operating property and equipment.

SCHUMAKER WALL BOARD CORP., Los Angeles, Calif., reported a net profit, after Federal income and excess profits taxes, of \$113,812 for the nine months from May 1, 1942, to January 31, 1943. This figure compares with \$220,799 for a similar period in 1941-42.

Lime Convention Postponed

THE NATIONAL LIME ASSOCIATION has decided through its Board of Directors to postpone its 1943 convention. Some group meetings will probably be held to reduce the amount of traveling. Plans for these meetings have not yet been worked out.

COTTRELL PRECIPITATORS SELECTED for KAISER'S NEW CALIFORNIA STEEL PLANT



In building the giant new \$83,000,000 Kaiser steel plant at Fontana, California, every item of equipment selected was the best obtainable... equipment conclusively proven superior through years of heavy-duty industrial service!

It is only logical, therefore, that COTTRELL Electrical Precipitators were chosen to handle the gas cleaning problems on the blast furnace and in the by-product coke plant... for COTTRELLS are recognized throughout the world as the most efficient method yet developed for recovering any kind of solid or liquid suspensions from gases, hot or cold!

Send for booklet describing COTTRELL Precipitators.



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► Regardless of your recovery problem, if it demands highest overall efficiency, low maintenance and long operating life — COTTRELLS are the logical choice! Let our engineering department recommend COTTRELL equipment to meet your particular requirements!

Washington Doings & Regulations

FOLLOWING the practice started with the March issue, the editors present here brief references to some of the more important official releases. Sufficient information is given for the interested reader to obtain full details from his local W.P.B., O.P.A., O.D.T., or whatever alphabetical agency is involved. The sooner you make an acquaintance with these local offices, the less likely you are to incur that \$10,000 fine and 10 years in jail, which violation of some one of the 1,000,000,000,001 rules and regulations may involve!

Mica Prices

O.P.A.—T-680: Maximum prices of domestic wet and dry ground mica and mica schist, water-washed mica and micronized mica are increased $\frac{1}{4}$ -cent a pound by the O.P.A. While scrap mica and crude mica schist are removed from price control to permit a higher level of domestic production of scrap and sheet mica (maximum price regulation 347), effective March 26.

Gasoline Rationing

O.P.A. Amendment No. 35 to Ration Order 5C effective March 20:

Section 1394.7706 (q) is amended to read as follows:

(q) By an engineer, architect, technician, construction worker, repair or maintenance man who requires the use of a passenger automobile or motorcycle for performing, or for transporting materials or equipment necessary to perform, construction work; or by any of the above described persons who require the use of a passenger automobile or motorcycle to travel from one place to another (but not from home or lodgings to a fixed place of work) for performing, or for transporting materials or equipment necessary to perform, any of the following services: installation, maintenance or repair services, the extermination of vermin, or the exploration, discovery or exploitation of natural resources for the purpose of obtaining necessary war materials; or by a person who requires the use of a passenger automobile or motorcycle to travel from place to place (but not from home or lodgings to a fixed place of work) for performing highly skilled services necessary to the operation or functioning of the establishments or facilities described in paragraph (c) hereof: *Provided*, That preferred mileage may not be allowed pursuant to this paragraph to any per-

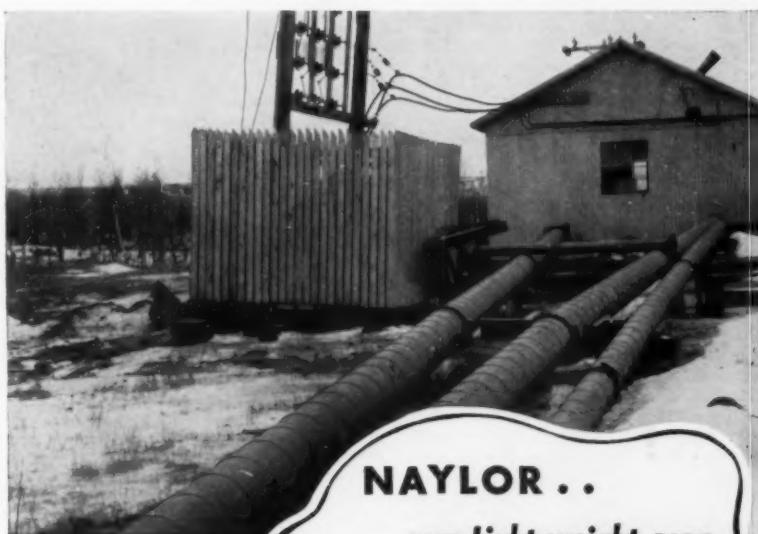
son while engaged in promotional, merchandising or sales activities or retail or wholesale delivery, or to any person for the repair, maintenance, installation or construction of decorations or decorative equipment, or of novelty, amusement or entertainment devices (other than non-portable motion picture equipment), or of portable household equipment or furniture, or for landscaping.

Excluded from Price Regulation

O.P.A.—1961: Excluded from Maximum Price Regulation No. 251 (Construction and Maintenance Services and Sales of Building and Industrial Equipment and Materials on an Installed or Erected Basis) and from all other price regulations are Defense Plant Corporation's—

(1) cost-plus-a-fixed-fee prime

(Continued on page 103)



NAYLOR ..

THE Light-weight PIPE

FOR Heavy-duty SERVICE

Saves WEIGHT • Saves STEEL

Saves TIME on installation

STRONGER - Leaktight - SAFER

Absorbs SHOCK LOADS

Handles JOBS normally requiring heavier-wall pipe

Cuts HANDLING costs

Cuts MAINTENANCE costs

FABRICATED to your exact specifications

Saves MONEY

Naylor Pipe is outstanding for high and low pressure air and water lines. Sizes from 4" to 30" in diameter with all types of fittings and connections.

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Davenport Better-Built Locomotives are delivering outstanding performance on a wide range of vital war assignments—here and abroad—for the United Nations because of AMPLE, easily controlled POWER, available at all times. Similarly, the United States is destined to perform a VICTOR'S role because the American people are delivering AMPLE POWER,

when and where required, in the form of fighting men, fighting equipment and dollars—an irresistible outpouring which expresses the indomitable SPIRIT of a determined and UNITED Free People who hold nothing in reserve when there is a job to be done.

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UNIVERSAL SCREENS



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"UNIVIBE" RIDDLES

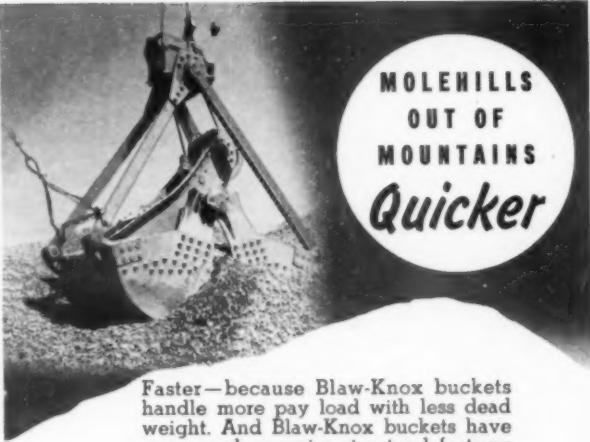
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BEST in screening equipment at
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A FOOL-PROOF TAGLINE

The Rud-o-Matic Tagline is operated on a spring principle and maintains at all times a positive tension sufficient to steady a clam shell bucket under any and all conditions, and will operate perfectly with the boom at any angle. It eliminates all the grief usually encountered with the average tagline as there are no weights, tracks, pins, carriages, or sheaves to wear out or to get out of order. Because of the large bearing and fewer sheaves, the saving on cable alone would eventually pay for it.

Tagline is complete with fair lead and cable attached and can be installed in less than one-half hour. Most of the crane manufacturers have adopted the Rud-o-Matic as standard equipment.

Manufactured by

McCaffrey-Ruddock Tagline Corp.
2121 E. 25th St., Los Angeles

Washington Activities

(Continued from page 101)

contracts and cost-plus-a-fixed-fee subcontracts, and

(2) contracts performed on the basis of costs only with no addition for profit.

These exemptions still leave contractors subject to all other price regulations with respect to their material purchases.

Cement Testing

W.P.B.—2897: Amendment to Limitation Order 179, issued March 23, to correct technical point in regulations covering testing of portland cement to prevent any possible misunderstanding.

Highway Construction

W.P.B.—2867: (Revocation of Limitation Order L-41-600) issued March 17: W.P.B. withdraws blanket authorization which had permitted road departments to begin highway construction jobs provided no critical materials which had been acquired after May 6, 1942, were used. W.P.B. also delegates to regional directors authority to permit start of highway construction jobs costing less than \$100,000 where Federal funds are not required and no priority assistance is needed.

Price Increase Procedure

O.P.A.—T-662: A method for granting price relief for specified manufacturers in a limited number of hardship cases is authorized. The procedure applies only to manufacturers covered by Maximum Price Regulation No. 188—Manufacturers Maximum Prices for Specified Building Materials and Consumers' Goods other than Apparel—and only when the following conditions are met:

1. The manufacturer is the sole producer of an essential article such as one for which the production and sale is affirmatively permitted by the War Production Board;
2. Costs exceed present ceilings, and
3. The company is operating at a loss.

Increases in ceilings prices may be made on an order from O.P.A. or any authorized officer and to an extent sufficient to permit the manufacturer to recover costs and a profit on the article.

This provision is contained in Amendment No. 7 to M.P.R. 188, effective March 11.

Truck Mixer Styles

W.P.B.—2662: Part 3115, Construction Machinery Simplification and

Conservation (Schedule VI to Limitation Order L-217): Ready mixed concrete truck mixers and agitators, after March 15, may be manufactured in only two specified models and in two sizes of each model. No metal may be used in running board platforms or drum guards except for supporting brackets.

The editors are asked to point out that this Order, while limiting future production of truck mixers to two and four cubic yard high dump models, does permit manufacturers to complete other sizes and types which were already in production in their plants. Therefore, purchasers of new truck mixers should not change from the size they have been using in the past without first finding out if truck mixers of the size they use are still available either in stock or coming from the production line which the manufacturer had begun prior to the issuance of the Order.

Mining Equipment

W.P.B.—Part 982 amending P-56: In effect the new order sets up a method of dovetailing P-56 into the Controlled Materials Plan (C.M.P.). Allocations of materials and equipment will be authorized from time to time for the mining industry as whole in the light of mine operating schedules and total time production goals.

The new procedure is calculated to permit orderly scheduling by the manufacturers of any new equipment, repair parts, machinery and other materials allotted the industry by the Mining Division of W.P.B.

W.P.B. will assign a serial number to each mine entitled to receive priority assistance and all mine serial numbers now outstanding will remain in effect until further notice.

Commercial Minerals of California

THE CALIFORNIA STATE DIVISION OF MINES has issued Bulletin No. 124 on the Commercial Minerals of California by George L. Gary, Mineral Technologist. The bulletin describes the properties, location, and occurrence of the various minerals found in the state. Included is data relating to markets and possible buyers of minerals as well as some technical data concerning tests for the different items mentioned. This bulletin is printed in mimeograph form and is loose leaf so that in the future, the Division of Mines can make additions and bring the reading matter up to date. The bulletin can be had without charges other than postage by addressing the Division of Mines, Ferry Building, San Francisco, Calif.



The Service Record of this wire rope continues to make and hold friends.

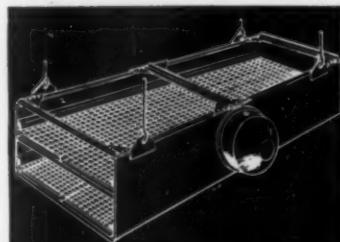
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5 DISTINCTIVE FEATURES . . .

1. Full Floating Shaft.
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ECONOMICAL

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Female
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FARREL BACON CRUSHERS

Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants.

Engineering Service



EARLE C. BACON, Inc.

17 John St., New York, N. Y.

Lime Association

W. VERNON BRUMBAUGH, secretary of the National Lime Association, has informed his members of the complications in the draft status of their employees, because the multitudinous classifications of lime. Groups of essential activities covering lime, limestone and dolomite are given as follows:

Group 11—Nonmetallic Mining and Processing and Quarrying: The mining and processing of rock salt, phosphate rock, sulphur, potash, asbestos, graphite pyrites, graphite, borates and other salines, fluorspar, mica, talc, abrasive sands, and similar products. Excludes all mined or quarried nonmetallic materials used exclusively in construction.

Group 17—Production of Chemicals and Allied Products and Essential Derivatives Thereof: Glycerin; turpentine, rosin, and other naval stores; wood tars, oils, acids and alcohols; plasticizers; lubricating oils and greases; animal and vegetable oils; fertilizers; tanning materials; chemical pulp; salt; synthetic rubber; coal-tar products; plastics; compressed and liquefied gases; refined sulphur; acids; caustic and other sodas; alcohols; electrochemical and electrometallurgical products such as carbide, sodium and potassium metals and high-percentage ferroalloys; drugs and medicines; insecticides and related chemical compounds; synthetic textile fibers used in military equipment exclusively; grease and tallow. (Explosives, flares, and other fireworks, generally classified as chemical products, are included with ammunition.)

Group 22—Production of Stone, Clay, and Glass Products: Scientific and industrial glass products; sand-lime, fire-brick, and other heat-resisting clay products; lime; abrasive wheels, stones, paper, cloth, and related products; asbestos products including steam and other packing.

pipe, and boiler covering; crucibles and retorts; porcelain electrical supplies; as well as parts of military apparatus.

Group 35—Technical, Scientific, and Management Services: The supplying of technical, scientific, and management services to establishments engaged in war production; union-management negotiation services; and the publication of technical and scientific books and journals.

Conference with O.P.A. on Liming Materials

AT A CONFERENCE on March 23, agricultural liming materials producers, dealers, and trade association men met with officials of the Office of Price Administration to discuss proposed regulations establishing nationwide maximum prices for both producers and retailers. Production costs, bagging, methods of sale, and delivery problems were discussed. It is expected that the regulations will be issued after April 1.

Good Gravel Business

MISSOURI GRAVEL Co., which operates plants at La Grange and Louisiana, Mo., and Barry, Ill., in addition to portable plants, reported a very excellent business in 1942, according to Superintendent C. D. Harvey. Operating about seven months, the La Grange, Mo., plant shipped more than 300,000 tons of gravel, approximately 90 percent of which was for highway construction and maintenance. The Barry, Ill., plant had the biggest business and 90 percent of its output went for ballast for the Wabash Railroad.

Start Products Plant

CONCRETE PRODUCTS AND MATERIAL Co., Omaha, Nebr., has purchased the Midstate Construction Company building in Hastings, Nebr., and will remodel it as a modern concrete products plant. Equipment valued at \$25,000 will be installed.

Don't Scrap it - WELD IT

THE TIME IS NOW!

For speedy, wartime emergency repair welding, you can't beat MANGANAL WELDING PRODUCTS. With MANGANAL you can meet every requirement for efficient, fast, durable repair welding.

Repair your broken and worn parts with Manganal—it's the easy, quick and efficient way. Manganal is an alloy steel welding, wedge bars and shapes give new lives to old parts.

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NEWARK, N.J.



NOW - MORE THAN EVER BEFORE.....

It is necessary to install equipment with long life built into its construction. Simplicity Gyrating Screens have a proven record of long life, made during the past seventeen years of operation in 1,500 different plants.

In addition, we maintain the very efficient Parts and Service Department of our company, ready at all times to provide the proper maintenance needed today to keep your equipment operating at top efficiency.

SIMPLICITY ENGINEERING CO.
DURAND - - - MICHIGAN

Uniform Separation

The new model GAYCO Centrifugal air separator makes possible the uniform and increased recovery of cement, lime and any other finely ground metallic or non-metallic material within a range of 80 to 400 mesh.

- Greater Capacity
- Cleaner Trailings
- 99% Through 325 Mesh
- 25% to 30% greater recovery of fines
- Not affected by variation in speed or rate of feed

Manufacturers also of "Reliance" Crushers, Screen, Elevators, conveyors, Bin Gates, Grizzlies. Complete crushing, screening and washing plants for crushed stone, sand and gravel.



Universal Road Machinery Co.

RUBERT M. GAY DIVISION 117 Liberty St. New York, N. Y.
Canadian Representative: F. H. Hopkins & Co., Ltd., Montreal
FACTORY & LABORATORY, KINGSTON, N. Y.



Keep your conveyor belts going with

FLEXCO

HD BELT FASTENERS



- FLEXCO HD RIP PLATES are used in repairing rips and patching conveyor belts. The wide space between outer bolts gives the fastener a long grip on the edges of the rip, while the center bolt prevents the fasteners from bulging.



- FLEXCO HD BELT FASTENERS make a strong, tight butt joint with long life. Recessed plates embed in belt, compress belt ends and prevent ply separation. Six sizes in steel and alloys.

FLEXIBLE STEEL LACING COMPANY
4684 Lexington St., Chicago



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your copy

FLEXCO HD BELT FASTENERS
Sold by supply houses everywhere

IF ENGINE POWER IS NEEDED . . . Here's Your Engine!

Machine designing engineers, contractors, farmers, oil operators and industrial users are more and more recognizing the amazing versatility, heavy-duty dependability, fit-the-machine compactness, light weight and economy of WISCONSIN AIR-COOLED ENGINES. Specify these engines for today's work as well as for tomorrow's applications.

Power range: 1 to 35 hp., 1 and 4-cylinder types. Model VE-4, 22 hp., 4-cylinder V-type illustrated.



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MILL DEPOTS: New York, Pittsburgh, Chicago
Ft Worth, Portland, Seattle, San Francisco
Distributors throughout the U. S. A.

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Completely controls the flow of any size material from Storage Bins, Hoppers or Open-Dump Chutes to Crushers, Conveyors, Screens, etc.

High in efficiency. Low in maintenance and power consumption.

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MANGANESE STEEL CASTINGS

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PULVERIZERS
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ROLLS
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for
SHOVELS
DREDGES
CRANES
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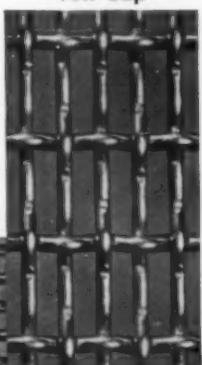


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TYLER
Woven Wire Screen
for
EVERY SCREENING PURPOSE!

Write—
THE W. S. TYLER COMPANY, Cleveland

Ton-Cap



Cement Production Leveling Off

Production of finished portland cement during January, 1943, as reported to the Bureau of Mines, was slightly higher than in January, 1942. However, the strong uptrend that had persisted since the beginning of 1940 is leveling off. Shipments in January, 1943, declined 5 percent from January, 1942, with the result that the overall stock situation at mills showed further improvement from the low point in October and on January 31, 1943, was only slightly below a normal operating level. Stocks of clinker on January 31 showed some improvement from December 31, but they have recovered only moderately from the badly depleted condition of last October and still are below stocks of the average January, 1935-39, period.

Production in January was 12,460,000 barrels, a 2 percent increase over January, 1942, while shipments from mills were 8,641,000 barrels.

Current statistics will now include the production of the new Puerto Rico plant. The following statement gives the relation of production to capacity and is compared with the estimated capacity at the close of January, 1943, and of January, 1942:

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

	January	Dec.	Nov.	Oct.
1942	1942	1942	1942	1942
The Month	59.0	60.0	67.0	80.0
12 Months	67.0	74.0	74.0	74.0
				73.0

Sand-Lime Brick Production and Shipments

Four active sand-lime block and brick plants reported for February and four for January, statistics for which were published in March, 1943.

AVERAGE PRICE FOR FEBRUARY

	Plant Price	Delivered Price
Detroit, Mich.	\$16.00
Saginaw, Mich.	\$13.00
Grand Rapids, Mich.	15.00
Seattle, Wash.	

STATISTICS FOR JANUARY AND FEBRUARY

	Jan.	Feb.
Production	342,000	726,000
Shipments (rail)	25,000
Shipments (truck)	381,000	532,400
Stock on hand	610,280	709,880
Unfilled orders	530,000	2,550,000

*Four plants reporting: incomplete, one not reporting stock on hand and two not reporting unfilled orders.

**Four plants reporting: incomplete, two not reporting unfilled orders.

Mutual Materials Co. reports that unfilled orders are large and they are manufacturing and delivering brick as fast as they can make them, and yet they are behind in production. J. B. Sunderland, president, says, "We have a great volume of business ahead to July or August and will be taxed to capacity to meet present commitments, to say nothing about orders which will materialize in the interim."

Dredge Boat Operators Meet in Pittsburgh

A CONFERENCE of sand and gravel producers who use the navigable waters of the United States was held at the William Penn Hotel, Pittsburgh, Penn., on February 25. The meeting was held under the auspices of the Western Pennsylvania Sand and Gravel Association with Ray V. Warren, secretary of the association acting as chairman. At the luncheon and afternoon session, about 30 members of the Ready Mixed Concrete Association joined in the meeting and the discussions.

I. R. Whiteman, assistant chief, priority section Maritime Commission, discussed the changes in priority rulings that went into effect March 31. It was pointed out that when floating equipment is leased for purposes other than production and transportation of sand and gravel, the P-56 order terminates. Executive Secretary V. P. Ahearn of the national association talked about the new food rationing regulations as they applied to dredge boat operators. For complete information, operators should read Gen. R. O. 5 form and Bulletin No. 16 issued by O.P.A. E. D. Edmunds of the Pittsburgh U. S. Employment office discussed manpower problems.

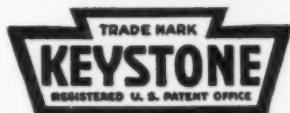
A.S.T.M. Cement Committee Meets in Allentown, Penn.

MEETINGS of the American Society for Testing Materials, Committee C-1 on Cement in Allentown, Penn., on March 6 were well attended. It was agreed to recommend to the Society that the Tentative Test for Autoclave Expansion of Portland Cement (C 151-40T) be advanced to standard with a few revisions in tolerances for pressure and apparatus. It was further agreed to recommend that the Tentative Method of Test for Compressive Strength of Portland Cement Mortars (C109-37 T) with minor revisions in methods and tolerances be retained as a tentative for another year. F. A. McAdams, Chief, Concrete Materials Section, W.P.B., addressed the meeting telling how much the W.P.B. was interested in utilizing any cement making facilities which are idle that can be used in the manufacture of other critical materials.

Road Builders Conference

AMERICAN ROAD BUILDERS' ASSOCIATION will hold a "business conference" in Chicago, May 5 to 7. This conference will replace the annual convention and road show which has been dispensed with due to war conditions.

. . . . For Greatest Efficiency Use Specialized Shovel and Crane Equipment



Offers Dependable Excavators Precisely Adapted to Your Needs



1-Yard Excavator

For maximum speed and efficiency on your excavating be sure you are using the right size and type shovel. KEYSTONE offers two sizes, sturdily built, to fit your needs. Model 19-A, 1 1/4-yd. shovel and crane for excavating and quarry clean-up. Model 18-A, 1-yd. excavator for special service—It is fitted with a 1-yd. skimmer for sand-strata separation and recovery, trench-hoes for crevice cleaning upon serrated rock strata, etc. Our many years of experience in solving excavating problems assure you of getting the right Rock Shovels—Dippers—Back Hoes—Skimmers—Drag Lines—Cranes—for use under your conditions.

Ask for Bulletins.

KEYSTONE DRILLER CO.
Beaver Falls, Penna.

← 1 1/4-Yard Shovel

Prevent BURN-OUTS at both KILN-ENDS

The use of PYRASTEEL Kiln Ends is not by any means confined to the discharge end.

Such high temperatures are frequently encountered at the feed end of the kiln, as to make the use of

PYRASTEEL SEGMENTS

the most practical method of preventing burnouts and interrupted operations.

There are many PYRASTEEL installations on the feed end and on the discharge end of rotary kilns . . . also where both the feed and discharge ends are provided with PYRASTEEL Segments. All are giving satisfactory results.

Write for Bulletin on this Heat-Resisting Alloy



CHICAGO STEEL FOUNDRY COMPANY

PYRASTEEL
for high temperatures

KEDZIE AVE & 37TH ST.
CHICAGO
Makers of Alloy Steel for 30 Years

EVANSTEEL
for strength

SAUERMAN

Power Scrapers



Dig and haul
any material
for few cents
per yard.

Operated
by one
man.

EVERY SAVING in man-hours at pits, mills and quarries is a direct contribution to the war effort. Sauerman Power Drag Scrapers are chosen for excavating and stockpiling because this simple, sturdy equipment has a 30-year record as a saver of labor and time in moving all kinds of earth materials.

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SAUERMAN BROS., INC.
530 S. CLINTON ST., CHICAGO



The
Harrington & King
PERFORATING CO.

5650 Fillmore St., Chicago—114 Liberty St., N. Y.

OBITUARIES

MAX W. BABB, chairman of the board of Allis-Chalmers Mfg. Co., Milwaukee, Wis., died recently at the age of 68. He had been board chairman since January, 1942 and president for ten years prior to that. He joined the Allis-Chalmers organization in 1904 as an attorney. Mr. Babb received his law degree from the University of Michigan in 1897. He obtained his bachelor of arts degree at



Max W. Babb

Iowa Wesleyan in Mt. Pleasant, where he was born in 1874. In 1913 Mr. Babb was made vice-president and general attorney of Allis-Chalmers, and was closely associated with the late General Otto H. Falk in the management of the concern. He succeeded Gen. Falk as president in 1932 when Mr. Falk became chairman of the board.

WILLIAM E. ERDELL, well known pioneer in the cement industry and retired president of the former Penn Allen Portland Cement Co., Allentown, Penn., died recently at the age of 75. Born in West Catasauqua on September 1, 1868, Mr. Erdell attended the public schools of that place and subsequently went to work for a brick company for 45c a day. But he soon found this work too confining and became a teacher in the Griesemersville school in Allentown. When the first six-month term had ended he resigned and joined the American Cement Co. as office boy. In 12 years he rose to the position of assistant superintendent. From then on his reputation as a cement man grew rapidly. In 1901 he was named superintendent of the Whitehall Portland Cement Co. Six years later he became general manager of the Penn Allen Cement Co. and when that

company was re-organized in 1910, was elected president. In 1926, Mr. Erdell disposed of his interests in the Penn Allen company to the Dexter Portland Cement Co. of Nazareth which subsequently became the Pennsylvania-Dixie Portland Cement Co.

JAMES R. SMILLIE, mill superintendent for the W. H. Loomis Talc Corp., Gouverneur, N. Y., for the past 22 years and long a prominent figure in the talc industry in this section, passed away recently at the age of 79.

J. R. BENT, for the past six years with Dolese and Shepard Co., Chicago, Ill., died recently at the age of 66. Prior to his connection with the crushed stone industry, he was director of the limestone-phosphate department of the Illinois Agricultural Association until its discontinuance in 1934. Mr. Bent was employed as director of the phosphate department in 1920. This was the first department of the Illinois Agricultural Association to be organized. In the same year the Association combined its limestone and phosphate committees and added this work to the duties of the phosphate department, which was thereafter known as the phosphate and limestone department.

Under Mr. Bent's direction, large quantities of rock phosphate were purchased from Tennessee and distributed to Illinois farmers. The limestone work was that of increasing supply sources, which at that time in Illinois were few and far between. In 1932 when purchases of both of these commodities were very low the I.A.A. discontinued the limestone-phosphate department and Mr. Bent severed his connections with the organization. He later did some limestone work for the Association in 1936. At the time of his death Mr. Bent was also secretary of the Midwest Agricultural Limestone Institute.



J. R. Bent

WILFLEY centrifugal SAND PUMPS



for Slurries, Sand Tailings
Slimes, Acid Sludges

Save Pumping Cost

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pumping parts of material best suited for YOUR particular problem. Complete engineering service. Prompt shipment of parts. The most efficient and economical pump you can buy.

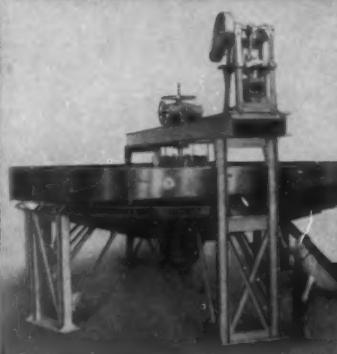
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LUDLOW-SAYLOR WIRE CO. ST. LOUIS



DENVER HYDRO- CLASSIFIER

The Denver Hydro-classifier is designed for fine screening and de-clustering problems where it is essential to reduce materials to sizes minus 200 mesh to 10 microns. Enclosed integral lift vertical worm gear drive makes it easy to raise rakes. The spiral rakes convey material to center cone in shortest time. Ask us how these machines will save you money. Write for bulletin No. C4-A-R.

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Single and double roll and jaw crushers, hammer mills, super dry pans, steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, hoists. Complete portable, semi-portable and stationary crushing, screening and washing plants for different capacities of any materials.

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Established 1835
Hollidaysburg, Pennsylvania

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10 Strategically-Located Steel-Service Plants

Principal products include—Alloy Steels, Tool Steels, Stainless Steel, Hot Rolled Bars, Hoses and Bands, Drawn and Heavy Structural, Channels, Angles, Tees and Zees, Plates, Sheets, Cold Finished Shafting and Screw Stock, Strip Steel, Flat Wire, Boiler Tubes, Mechanical Tubing, Rivets, Bolts, etc. Write for Stock List. Joseph T. Ryerson & Son, Inc. Plants at Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

DIAMOND BALANCED VIBRATORS



Violent vibration for fast, positive separation all over the screen—controlled by accurately balanced design for smooth action. Long life, low maintenance costs. No choking. Fast delivery. Tell us your needs. Write for Bulletin D-42Y.

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11 Sizes in 1-2-
2 1/2-3-4 Decks

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**WON'T QUIT
OR CAUSE TIME OUT**

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

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PERFORATED METAL SAND AND GRAVEL SCREENS

Manufactured exactly to your specifications
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices

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Canal 1459

Manufacturers' News

Hercules Powder Co., Wilmington, Del., has won a "Liberty Bell" safety award, presented by Liberty Magazine, for its safety record despite expanded wartime production of explosives. Hercules was selected by the National Safety Council for this award, which is the second of the "Liberty Bell" awards to be made.

Whiting Corp., Harvey, Ill., announces that the headquarters of its Canadian subsidiary, Whiting Corp. (Canada) Ltd., has been moved to 45 Richmond St., West, Toronto, where its newly elected vice-president and general manager, H. M. Rowlette, will be in active charge of the Canadian business. He succeeds Col. James Mesa, now devoting full time to Government duties at Ottawa. Serving with Mr. Rowlette as assistant general manager is Alex Ritchie. H. T. Doran, 515 New Barks Bldg., Montreal, and W. Bruce Campbell, 828 Royal Bank Bldg., Winnipeg, will continue as sales representatives of the Canadian company.

Mack Trucks, Inc., Long Island City, N. Y., has appointed William S. Newell to the board of directors. Mr. Newell is president of Todd-Bath Iron Shipbuilding Corp. and president of Bath Iron Works.

Wickwire Spencer Steel Co., New York, N. Y., has appointed W. A. Steele as general superintendent of the company's Buffalo works, succeeding Fred Johnson, who is retiring from active duty after more than 20 years with the company.

Cummins Engine Co., Columbus, Ind., has announced several changes in executive personnel, two of them created by the resignation of J. I. Miller, vice-president and general manager, to accept the commission of lieutenant in the United

States Naval Reserve. Succeeding Lieutenant Miller, who is now on active duty, is V. E. McMullen, former works manager for the company. Taking Mr. McMullen's place as works manager is Carl R. Fox, who advances from the position of assistant works manager. Other changes find J. D. Allen, credit manager, elevated to the post of assistant sales manager and K. M. Leech, sales engineer, promoted to assistant service manager.

Stoody Co., Whittier, Calif., announces that John P. Caluwaert has resigned his position as manager of welding sales for the J. E. Hasseltine Co., Portland, Ore., to accept the position of welding engineer for the Stoody Co. Mr. Caluwaert will still serve the eastern Oregon and Washington territory, but will now work with all types of industrial concerns as well as lumber companies, contractors, pulp plants, etc., on problems involving abrasive wear.

The B. F. Goodrich Co., Akron, Ohio, has named John M. Davies director of physical research.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has announced the following promotions in the tractor division: A. W. Van Hercke, sales manager, has been made assistant manager. He will coordinate all engineering and development work. A. F. McGraw, sales promotion manager, has been appointed general sales manager, heading up industrial and agricultural sales. R. A. Crosby of the advertising department, who has been loaned temporarily to the



J. P. Caluwaert

Salvage Section of the W.P.B., will be advertising manager.

Willamette Hyster Co., Peoria, Ill., whose home office is at Portland, Ore., has been awarded the Army-Navy "E" pennant for excellence in production in the war effort.

American Pulverizer Co., St. Louis, Mo., has appointed Howard L. Hill as their Eastern representative.

Peerless Pump Division of Food Machinery Corp., Los Angeles, Calif., has selected James H. Hait, chief engineer, as general manager of the new division known as the Food Machinery Corp., Division of Procurement and Engineering.

New Incorporations

Cooper Mica Co., Asheville, N. C., has been organized to prospect, locate and mine any and all kinds of minerals; authorized capital stock \$25,000, subscribed stock \$300. Incorporators are John M. Cooper and A. D. Dolliver, both of Asheville, and Bill Atkins of Burnsville.

Norton Cinder Block Co., Inc., Norton, Va., has been incorporated with a capital of \$25,000. M. M. Heuser is the incorporator.

Vacuum Concrete, Inc., a Pennsylvania corporation, has been authorized to do business in Virginia, and has increased its maximum authorized capital stock from \$100,000 to \$300,000. C. T. Corporation System, 123 South Broad St., Philadelphia, filed the amendment.

Strategic Minerals Corp., Spruce Pine, N. C., has been organized with a capital of \$25,000. Fay Calloway, Newland, N. C., is the incorporator.

Morton Mining Co., Spruce Pine, N. C., has been incorporated. E. A. Ellis is the incorporator.

New and Rebuilt Equipment

We are proud of the fact that vital equipment—so necessary in the war production effort—has been procured through and by our organization for many of America's leading industrial firms.

**KILNS, COOLERS, DRYERS
CRUSHERS, TUBE MILLS,
CRANES, ETC.
MOTORS, GENERATORS AND
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Inquiries invited. Consult us regarding your equipment problems. For prompt action, wire or phone.

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**YOU SHOULD NEVER FORGET
WHY YOU SHOULD BUY**

The aims behind the War Bond Payroll Savings Plan are—

1. To help pay the stupendous production costs of winning this war.
2. To siphon into production channels that portion of America's current income which would otherwise flood the Nation with inflationary cash.
3. To create individual backlog of financial security for use during the industrial readjustment after the war.
4. To create a Nation-wide saving habit which will serve the interests of both Capital and Labor after the war.

Keep after that "10% of gross payroll goal"! Buy War Bonds to the limit yourself—encourage your employees to do likewise!



Obituaries

(Continued from page 108)

WILLIAM F. WADE, operator of a sand and gravel business on the Bee- son property south of Dodge City, Kan., died recently at the age of 52.

WILLIAM M. BROOKS, owner of the Brooks Gravel Co., Shell Rock, Iowa, passed away recently at the age of 77.

GEORGE H. BALFE of Lafayette, Ind., general manager and purchasing agent of the Monon Crushed Stone Co., Monon, Ind., died recently at the age of 68. He had been associated with the company since 1919. A life-long resident of Lafayette, Mr. Balfe attended Purdue University school of civil engineering as a member of the class of 1894.

WILLIAM O. WALTON, president of the Huntington Sand and Gravel Co., Huntington, W. Va., passed away recently at the age of 88.

THOMAS H. ARNOLD, service engineer for The Babcock & Wilcox Co. since 1934, died suddenly in Mexico City at the age of 57. At the time of his death, Mr. Arnold was supervising a large pulverizer installation at the Mexico City plant of Mixcoac Cement Co. He was born in Gladwynn, Penn., in 1886 and was graduated from Pennsylvania State College. He was later connected with the Southwestern Cement Co. and the Department of Interior at Washington, D. C.

J. W. GARDNER, president of the Gardner-Denver Co., Quincy, Ill., until his retirement several years ago, died recently at the age of 80. Mr. Gardner was a student of Illinois College in 1881 when he became a permanent employee in his father's company—the Gardner Governor Co., founded in 1859. In 1883 the company erected a plant in Quincy. In 1905 Mr. Gardner, who had completed his preliminary training by

progressing through the various departments of the company, was selected by his father to assume active management. Under Mr. Gardner's able direction, extending over a period of more than 60 years, the Gardner-Denver Co. grew from a small concern employing 40 men to the present company with its payroll of more than 2000 employes. During his period of active management, Mr. Gardner served as president, chairman of the board and finally as chairman of the executive committee. A few years ago, ill health forced him to become inactive.

JOHN BALDONI, president of the Rhode Island Sand and Gravel Co., Hills grove, R. I., passed away recently at the age of 42.

HENRY W. LACKEY, retired president of the Blue Island Concrete Block & Material Co., Blue Island, Ill., passed away recently at the age of 72.

Classified Advertisements

POSITIONS WANTED — POSITIONS VACANT
Set in six-point type. Minimum \$1.00 each insertion, payable in advance.

INFORMATION—Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED—Displayed or undisplayed. Rate per column inch, \$5.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

CRUSHERS, MILLS, ROLLS

10½" x 22" New England Jaw Crusher.
11" Traylor Double Gyra-crusher.
Williams No. "Regular" Hammermill.
Williams No. 2 "Semi-Vulcanite" Hammermill.
Sturtevant No. 0 Rotary Fine Crusher.
Allis-Chalmers 42" x 10" B double roll crusher.
Single roll 24" x 38" heavy duty coal crusher.
Simplex Unit Coal Pulverizer, type 35 A.
24" x 30" 1 roll crusher with knives.
36" x 30" American Standard double roll crusher.
18" x 24" x 30" American Standard Disintegrator.

SCREENS, WASHERS, SAND TANKS

2-Jigger vibrating screens, 2-deck 2' x 5'.
2-Hummer vibrating screens, 3' x 5' V20.
4—Revolving screens, 2' x 5', 30" x 12', 4' x 16',
39" x 20'.
2-No. 7 Telamith Dewatring tanks.

BUCKET ELEVATORS

40' elevator 12" malleable buckets on chain.
50' elevator 15" malleable buckets on chain.
50' elevator 18" malleable buckets on chain.
50' elevator 20" malleable buckets on chain.
50' elevator 22" malleable buckets on chain.
25' elevator 12" malleable buckets on chain.
6-25' elevators 4" and 5" buckets on belt.
35' continuous elevator 30" buckets, 2' str. chain.
2000# 6-ply elevator belt with 18" buckets for grain.
Gears, sprockets, elevator and drive chain.
Malleable, Sallen and Continuous buckets, 4" to 30".

BELT CONVEYORS

20' trough belt conveyor up to 350' ball bearing idlers.
30' trough belt conveyor up to 200' with belt.
30' trough belt conveyor 100' long with belt.
42' trough belt conveyor up to 260' with belt.
54" - 42" - 30" - 30' conveyor belt.
7' cast head and tail pulleys for 36" belt.
Head and tail pulleys for conveyors.
Cast iron and steel drive pulleys.

AIR COMPRESSORS

14 x 12 Chicago belted, 100 hp. slip ring motor.
4 cyl. Schramm V-belt to 60 hp. motor.
2 cyl. I-R vertical hopper cooled, 44 CFM.
1-R portable 275 CFM with 50 hp. Waukesha engine.

MISCELLANEOUS

10-ton Davenport Standard gauge gasoline locomotive.
8-ton Whitecomb 36" gauge gasoline locomotive.
4-ton Vulcan 36" gauge gasoline locomotive.
30" gauge Mercury storage battery locomotive.
75 hp. Fairbanks-Morse Diesel, type YV, 300 rpm.
3 electric car pullers.
Generators for Hummer vibrating screens.
Centrifugal water pump motor, pins and tanks.
Revolving dryer, 48" x 21', 18" flue.

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Drag Scrapers

1 Sauerman, 2½ cu. yd., bottomless
1 Sauerman, 1½ cu. yd., bottomless
1 set Blocks and Sheaves for above

Hoists

1 Clyde, 2-drum, expanding band, roller bearing.
Capacity: 14000# at 300 F.P.M.
front drum, 4700# at 600 F.P.M.
rear drum.

Elevators

2 Twin City, 4-cylinder, 28 HP, gasoline
1 Continental, 4-cylinder, 100 HP, gasoline, with pulley and V-belts
21 LeRol, 2-cylinder, 8 HP, gasoline engines with clutches and power take-offs.

Ready-Mixed Concrete Tanks

18 Clinton 3½ cu. yd. Agitators
3 Clinton 2 cu. yd. Agitators

Screens, Vibrating

1 Coyle & Roth, 3' x 6', single deck
7 Link-Belt, 4' x 10', double deck
1 Link-Belt, 5' x 10', single deck
1 Symons Rocker, 4' x 8', double deck
2 Hummer Screens, 4' x 8'

Rotary Screen

1 Link-Belt, 6' x 16', 4" openings, with drive and trunnions

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- 2—Vulcan Iron Works steel rotary kilns, 7'6" x 7' dia. 125' long, fire brick lined.
- 7—W. F. Mosser & Son steel rotary kilns, 5'6" x 5' dia. 60' long, fire brick lined.

PULVERIZERS

- 26—42" Fuller Lehigh pulverizers, each with belt idler
- 3—33" Fuller Lehigh pulverizers, each with belt idler.

Two Complete COAL PULVERIZING PLANTS

Consisting of:

- 4—Fuller Lehigh Pulverizers—Jeffrey 24 x 24 Coal Crusher, Ruggles 6' x 41' Rotary Dryer, Conveyors, elevators, etc.
- 3—Fuller Lehigh Pulverizers—5 x 30 Ruggles Rotary Dryer, Conveyors, elevators, etc.

CRUSHERS

- 1—Allis-Chalmers Fairmont Roll Crusher, 36" x 60".
- 2—No. 6 Gates gyratory rock crushers.
- 1—No. 6 McCully gyratory rock crusher, style K.
- 5—No. 5 Gates gyratory crushers.
- 1—Mosser rotary clinker crusher.
- 1—No. 10 McCully gyratory rock crusher.
- 1—Jeffries 24" x 24" single roll coal crusher.

DRYERS

- 3—W. F. Mosser & Son steel rotary dryers with 65" steel stack.
- 2—W. F. Mosser & Son steel rotary dryers, 72" x 60" dia. 60' long, bevel geared drive, each with counter shaft and 40' steel stack.
- 1—W. F. Mosser & Son steel rotary dryer, 72" x 60" dia. 55' long, bevel gear drive, with counter shaft and 35' steel stack.
- 1—W. F. Mosser & Son steel rotary dryer, 72" x 60" dia. 55' long, bevel gear drive, with counter shaft and 50' steel stack.

BUCKET ELEVATORS

Thousands of feet of Bucket elevators, all sizes of buckets, mostly all steel encased.

QUARRY

- 2—Steam shovels, Bucyrus, 70-ton 2½ yards.
- 1—Steam shovel, Vulcan Little Giant, 35-ton 1½ yards.
- 1—Double drum steam hoist, S. Flory Mfg. Co., 11" x 14" duplex.
- 3—Brookville Fordson locomotives.
- 1—Westinghouse 60" single drum electric hoist.
- 1—Bucyrus No. 40—R steam shovel.

AIR COMPRESSORS

- 1—Ingersoll-Rand 18½" x 14" x 18" horizontal duplex air compressor, belted motor drive, with 36" x 20" riveted steel air receiver.
- 1—Ingersoll-Rand Duplex Air Compressor, 11" x 16" and 18" x 16" belted motor drive.

MILLS

- 1—Williams Mill, size 3.
- 5—No. 8 Krupp steel ball mills, spur geared, with counter shaft.
- 1—Allis-Chalmers Compab Mill complete, gear driven from counter shaft through magnetic clutch, and with induced fan ventilation and dust collectors.
- 14—30" Griffen Mills.
- 1—Bradley Hercules Mill complete with stellated die ring, feeder, counter shaft.
- 1—Allis-Chalmers steel ball mill, 7' dia. x 30' long, spur geared with rope drive.

CONVEYORS

- Rubber Belt Conveyors 16", 20", 24". Continuous Pan Conveyors, 18" Link Belt.
- Steel Screw Conveyors, 12", 16" in steel box.
- Steel Screw Conveyors, 8" in steel trough.
- Canvas Belt Conveyors, 30".

3 BOILER PLANTS COMPLETE

- 2—Edgemoor Waste Heat Boilers 800 HP each 200 lbs. pressure, complete with motor driven fans, economizers, super heaters, and steel stacks.
- 3—900 HP Babcock & Wilcox Waste Heat Water Tube Boilers, 200 lbs. working pressure, complete with motor driven fans, economizer, and steel stacks.
- 2—400 HP Babcock & Wilcox Water Tube Boilers, 200 lbs. pressure, Combustion Eng. Co. type E stokers.
- All complete with Generator Boiler Feed Pumps and Feed Water Heaters.

230 v. D.C. ENGINE SETS

- 1—Penn. Iron Works, horiz. cross compound Corliss steam engine, direct conn. to 475 KW G. E. generator, 100 RPM.
- 1—Allis-Chalmers 18" x 36" x 42" horiz. cross compound Corliss steam engine, direct conn. to 400 KW Allis-Chalmers generator, 100 RPM.
- 1—C. & G. Cooper Co. 24" x 40" x 36" horiz. cross compound Corliss engine, direct connected to 575 KW. Cr. Wh. generator.
- 1—Robt. Wetherill & Co. Tandem Compound Corliss Steam Engine 20" x 34" x 42" direct connected to 400 KW All.-Ch. Generator.
- 1—Rice & Sargent Cross Compound Corliss steam engine 24" x 48" x 48" direct conn. to 800 KW G. E. Gen.
- 1—Southwark F. & M. Co.—Cross Compound Corliss Steam Engine, 24" x 48" x 48" direct conn. to 750 KW G. E. Generator.
- All above complete with switchboards.

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- 6—W. W. Sly Dust Collecting systems, each with exhaust fan, 10 HP motor and cyclone dust collector.

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- 1—300 HP Electric Dynamie 500 RPM.
- 2—250 HP Wsghse.
- 3—150 HP Diehl Mfg. Co.
- 1—150 HP Gen. Elec.
- 1—125 HP Gen. Elec.
- 1—125 HP Gen. Elec. 550 RPM.
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- 1—100 HP Wsghse.
- 1—100 HP All-Chal. 335 RPM.
- Hundreds of motors from 7½ HP up. All with starters.

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- Complete machine shop consisting of 7 lathes, 2—12", 3—24" and 21", 40" Swing 5', 6', 10', 12', 2—18", 22" beds. Drill press, bolt threading machines, shaper, slotting machines, planers, milling machines, steam hammer.
- 1—Vertical double head boring mill, 57".

MISCELLANEOUS

- 2—Howe Scales 52" x 70"; Fairbanks Morse Scale 42" x 42".
- 4—Buffalo Forge Blowers & Exhausters.
- Pumps, Shafting, Pulleys, etc. Over 50 steel plate storage bins and hoppers, various sizes.
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1—Kennedy-Van Saun Hammermill Crusher. 54" Dla. x 48".
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Equipment bought new. Never used. Excellent condition. Telephone, Wire or Write—F. Clay Oxford, Receiver for American Portland Cement Co., Foreman, Arkansas. Tel: 199.

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Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	— 1/16"	20"	5	1/8"	— 1/32"
42"	5	1/8"	— 1/16"	20"	4	1/8"	— 1/32"
36"	6	1/8"	— 1/16"	18"	4	1/8"	— 1/32"
30"	6	1/8"	— 1/16"	16"	4	1/8"	— 1/32"
30"	5	1/8"	— 1/16"	14"	4	1/16"	— 1/32"
24"	5	1/8"	— 1/32"	12"	4	1/16"	— 1/32"
24"	4	1/8"	— 1/32"				Inquire For Prices - Mention Size and Lengths

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"A" WIDTH All Sizes | "D" WIDTH All Sizes
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	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE I.D. Size	Length per Length	Couplings
½"	25 feet	\$5.00 — \$1.50 Pair
	50 "	10.00 — 1.50 "
¾"	25 "	6.25 — 2.50 "
	50 "	12.50 — 2.50 "
1"	25 "	10.00 — 3.50 "
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400 Barrel Butler Portable Steel Cement Bin with Fully automatic control and remote control.

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36x60 Fairmount & 36x20 Diamond.
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 10x8, 13x7 1/2, 14x7, 15x9, 15x10, 16x9, 16x12, 16x10, 18x11, 20x8, 20x10, 26x12, 30x15, 30x13, 36x15, 36x30, 26x18, 36x14, 36x9, 36x12, 36x24, 42x24, 48x24, 48x36, 50x42, 48x66, 36x36.

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52HP. GEN. ELEC. 3/60/440v., 1200 rpm.

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Diesel, Natural Gas Engines, with and without Generators.

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End Crusher, 13x24, 21x42". McLanahan

& N. 18x18". Jeffrey, 36x60. Fairmount Cor-

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Coarse bowl.

2-, 3- & 4-Yard Koppel & Atlas Steel Dump

cars.

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Compressors, Elevators, Conveyors, Screens.

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- One (1) Link Belt Apron Feeder, 8' Centers, 18" Wide with 14" steel pans.
- One (1) 18"x18" Jeffrey Apron Feeder.
- One (1) Studebaker Dempster-Dumpster truck, 2 1/2 ton Capacity, 1938 Model, complete with five boxes.
- One (1) Diamond T Dempster-Dumpster truck, 2 1/2 ton Capacity, 1938 Model, complete with five boxes.

THOMASVILLE STONE & LIME CO.
THOMASVILLE, PENNSYLVANIA

LOCOMOTIVES SHOVELS—CRANES CARS

- 1—50 ton American 4 wheel saddle tank, code boiler, standard gauge, being rebuilt.
- 1—22 ton American 4 wheel saddle tank, code boiler, standard gauge, overhauled.
- 1—33 ton Standard Gauge Vulcan saddle tank, ASME code boiler.
- 5—62 ft. flat cars, 80,000 lbs. capacity, cast steel truck frames, steel draft sills, wood superstructures, interchange condition.

Crane or Dragline Fronts for Marion 37 and Bucyrus 50-B, One Each.

1—1 1/2 yard Rehandling Clamshell Bucket, Practically New.

Birmingham Rail & Locomotive Co.
BIRMINGHAM, ALABAMA

FOR SALE

Traylor 14" Bulldog Gyrotary Crusher, Machine #13342, designed to make 2" stone.

200—24" gauge flat cars, Koppel Manufacture Roller Bearings 36" long.

17—Koppel 24" gauge 12# Rail turntables.

2—Broughton Mixers, 1 ton and 1 1/2 ton with automatic scales.

80' Continuous chain drive 12" conveyor.

Lewfrank Industrial Corp.

325 St. Paul St., Rochester, N. Y.

Swing jaw liner, manganese for 24"x36" Farrell Bacon Crusher. New. Cheap. Hardware for 14"x14" Stiff Legg Derrick. Used six months. Reasonable.

Address Box B-2, Care of Rock Products, 309 W. Jackson Blvd., Chicago, Illinois

FOR SALE
RAYMOND PULVERIZING MILL, 5 roller construction, capacity 33 tons in 12 hours, operates at 2100 R.P.M., fan 1100 R.P.M., grinds minerals to 99% 1/4 mesh. In good substantial condition, available inspection, price reasonable. Location in Mercer County, Ky. Contact Brandeis Machinery & Supply Company, Brook and Warnecke Sts., Louisville, Ky. Phone Magnolia 6680. No priority required.

CONVEYORS

- 1—36" x 80' complete with all mechanical parts and belt. 14" wide roller bearing type.
- 1—All steel, 42" x 250' centers with supporting structure, all mechanical parts, motor, belt, etc.
- 1—42" x 60' same as above.

CRANES AND SHOVELS

- 1—Northwest model 185 Shovel and Crane.
- 1—Universal Lorain model 35 Truck Crane, 24' boom, 15' jib, double drums for clam shell work.
- 1—Marion 2 yd. capacity. Steam Shovel, crawler track.
- 1—American Hoist & Derrick 18 ton, standard gauge. Locomotive Crane, gasoline powered, available in 60 days for sale or rent.
- 1—Link Belt 25 ton Locomotive Crane, standard gauge, 50' boom, 8 wheels, double drums, ASME code boiler.
- 1—McMyler 25 ton Locomotive Crane, same as above.

CRUSHER SPECIALS

- 1—New Holland 7 x 12.
- 1—Champion 9 x 15.
- 1—Cedar Rapids 9 x 36.
- 1—Buchanan and 1—Farrel 13 x 30.
- 1—Acme 14 x 24.
- 1—Reliance 14 x 24, all steel.
- 1—Farrel 24 x 36.
- 1—Allis Chalmers 36 x 42, used only 3 months.
- 1—Tremith 16-A.
- 1—Allis Chalmers 6" and 10" Superior.
- 1—Traylor 12" and 16" gyrotary.
- 1—Symons 2' and 3' Cone Crushers, coarse bowl.

CRUSHERS—GYRATORY

All standard makes Size No. 4, openings 8 x 30, to Size 21, openings 42 x 134".

CRUSHERS—JAW

8 x 16 up to and including 60 x 84.

CRUSHERS—ROLL

- 1—Traylor 14 x 30 double roll.
- 1—Traylor 18 x 42 double roll.
- 1—Link Belt 24 x 24 single roll coal crusher.
- 1—Stewart 14 x 20.
- 1—Allis Chalmers 24 x 54 double roll.

DERRICKS AND HOISTS

- 1—Stiff Leg Derrick, 80' boom, 125 H. P., 3 sections, hoist with swinger, with or without 2 yd. capacity bucket.
- 1—35 ton all steel Stiff Leg Derrick, 50' boom, with or without 80 H.P. double drum electric hoist.

DRYERS AND KILNS

- 1—6' x 30'.
- 1—5' x 48'.
- 1—7' x 90' Kiln.
- 1—8' x 80' Kiln.

BOOT BUCKET ELEVATOR

- 1—Link Belt, motor driven, steel housing, size 15" x 42" x 30' high, style No. 2C, serial No. W-7001, complete with No. 88 Link Belt chain and 4" x 6" buckets with K-1 bucket attachments.

HOISTS—MINE

- 1—Single drum 108" dia., 84" face, 1900 lbs. single line pull with 400 H.P. motor, thoroughly modern and complete.
- 1—30" dia., 84" face, Mine hoist.
- 1—National 80 H.P., single drum, electric, 10,000 lbs. single line pull, 300 FPM, with 80 H.P. slip ring motor and separate 10 H.P. electric swinger, in new condition.
- 1—Single drum Mine Hoist, 48" dia., 42" face, with 100 H.P. slip ring motor, new condition.
- 1—Single drum 80" dia., 60" face, 400 H.P. slip ring motor, 32,000 lbs. single line pull, 400 FPM.

LOADER—TRUCK

- 1—Barber Greene, crawler tread, model 82-A, 38 H.P. gasoline motor.

LOCOMOTIVES

- 2—Ironton 7000 lb. battery type, 36" gauge, with batteries.
- 1—Ironton 3/2 ton, storage battery, 36" gauge.
- 1—Ironton 7 ton, 36" gauge, Trolley type, with or without charging panels.
- 1—Vulcan 20 ton and one 30 ton, standard gauge, steam, 4 wheel, saddle tank, ASME code boilers.
- 1—American 40 ton, 3 wheel, standard gauge, saddle tank, cylinder 14 x 22, 190 lbs. working pressure, ASME boiler. For sale or rent.

PUMPS

- 1—12" Morris Dredge Pump, belt drive.
- 1—4" Centrifugal 100 H.P. A.C. motor, 710 GPM, 356 head.
- 2—12" Centrifugal Pumps, cap. 5,000 GPM, 125" head, 300 H.P. A.C. motor.
- 1—6" Centrifugal 75 H.P. A.C. motor, 800 GPM, 236" head.
- 1—10" Centrifugal all bronze, 3,000 GPM, 200" head.

WE WILL BUY ANY MODERN PIECE OF EQUIPMENT ANYWHERE.

A. J. O'NEILL

LANDSDOWNE THEATRE BLDG.

LANDSDOWNE, PA.

Philadelphia Phone: Madison 8300

1913

Dependable Machinery for 30 Years

1943

1	BATCHING PLANT	Butler, 2 cu. yd. cap, consisting of 2 compartment Bin, 2 yd. Batcher calibrated for 300 pounds, beams and indicator.	\$1385.00	
1	SHOVEL	Koehring Model No. 2, 1 cu. yd., head duty, good condition.	\$8250.00	
2	SHOVELS	Osgood, 1 cu. yd., each, finished a job ready for service. EACH \$7950.00		
1	COMBINATION SHOVEL & DRAGLINE	Bucyrus-Erie Model D2, 1 1/4 cu. yd., powered by Diesel Engine, ready to go.	\$7775.00	
1	SHOVEL, TILTO	SHOVEL & CRANE	Osgood, 1 cu. yd.	\$5000.00
1	CRANE	Model 206 P. & H. 1/2 cu. yd. cap., 40' boom gasoline powered.	\$2500.00	
1	TRENCH HOE ATTACHMENT	For Thew Lorain Model 55, 5' or 1 yd. machine.	\$1600.00	
6	SAW RIGS	New and Unused Model 1000, 10 ft. long, gasoline engines, equipped with 14" crescent and rip-saw blades; offered at \$34.00 reduction. EACH \$ 295.00		
1	HYDRAULIC VIBRATOR	Jackson Model HS-A1, complete with hydraulic hose and 2 1/2" inch diameter blade, 10 ft. long.	\$ 275.00	
2	VIBRATORS	New and unused Master Model 23, powered by 3 H.P. Gasoline Engines, 12 foot Core & Casing. EACH \$ 345.00		
2	VIBRATORS	New and unused Model 4C Electric Concrete Vibrators, complete with 12 foot Core and Vibrating Head. No priority needed. EACH \$ 246.00		
1	TRACTOR AND SCRAPER	"Caterpillar" Model Sixty Gasoline Tractor with Double Drum LeTourneau Power Control Unit and LeTourneau G6 Scraper. \$3575.00		
1	TRACTOR WITH BULLDOZER	"Caterpillar" Model D4 Gasoline equipped with LeTourneau Bull-dozers. RENT ONLY		
1	COMPRESSOR	Gardner-Denver Portable, 300 ft. foot, powered by "Caterpillar" Diesel Engine, 4 steel wheels. RENT ONLY		

800 WEST MAIN STREET

ROY-E-WHRYNE

SURVEY COMPANY

CRUSHERS

GYRATORY: 42" Gate, K. 30" Superior McCully (Like new). 30" Superior McCully. Gates Nos. 12, 10, 9, 8, 7 1/2, 6, 5, 4, 2, 1 (75 avail.) Telamith Nos. 4, 5, 6, 7, 8, 9, 10, 12. Also many Allis-Chalmers, Kennedy and Trexler, many sizes.

FAW TYPE: Traylor 60x84, 48x60, 42x61, 34x72, Superior 64x66 & 24x36, Buchanan 30x42, Farrel 60x42, 30x36, 24x36, 18x36, 12x24, Good Roads 1030, Acme 24x40, Misc. 7x12, 9x16, 8x20, 8x24, 12x24, 9x36, 15x36.

REDUC. TYPE: Kennedy Nos. 25, 37 & 49. Telamith 3-F & 40. Traylor 36", 72", 8", 10", 12". Super. McCully 6" & 10". Newhouse 5, 7 & 10". 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AIR COMPRESSORS

Portable and stationary, belt with elec. or gas power, sizes from 20 cu. ft. to 1,000 cu. ft.

CONVEYORS

1—18" x 50' Link Belt stationary conveyor, troughing belt type, elec. or gas power.
1—24" x 25' Northern portable belt conveyor elect. power.
1—18" x 46' Smith Eng. Works, troughing type belt conveyor, elec. power.
1—14" x 25' Farquar portable scoop conveyor, gas power.

CRUSHERS

1—30x30" Jeffrey, single roll coal crusher, No. 1376.
1—No. 4 Champion jaw crusher, size 9x15", Ser. No. 2606.
1—No. 2 Climax jaw crusher, size 9x16".
1—Buchanan jaw crusher, size 10x16".
1—Acme jaw crusher, Ser. No. 1873, size 12x20".
1—Acme jaw crusher, Ser. No. 1686, size 9x16".
1—United Iron Works, "Blake-type" jaw crusher, size 9½x24".
1—Allis Chalmers, No. 5 gyratory crusher, Ser. No. 5331, opening 10x38".
1—Austin No. 5 gyratory crusher, Ser. No. 2945, opening 12x35½".

LOCOMOTIVES

4—7 ton Plymouth type 2, Model D L 24" gauge locomotives power gasoline engines.
3—7 ton Whitecomb type MO 24" gauge power gasoline engines.
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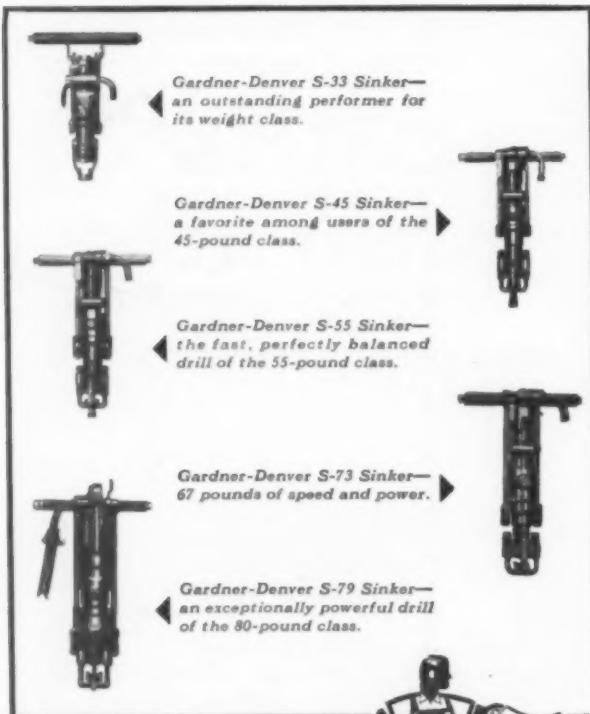
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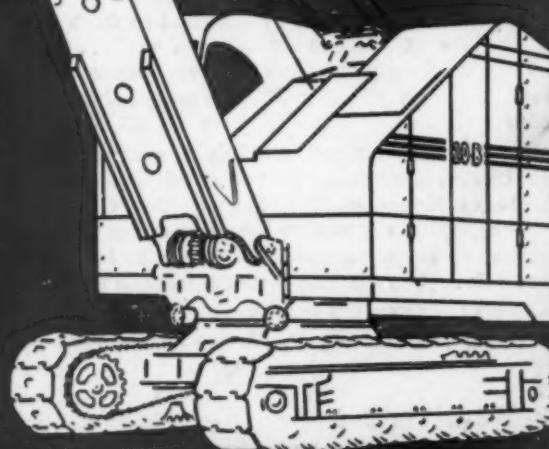
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